THE IRON TRADE REVIEW

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DECIDED STRENGTH

SHOWN BY MARKET IN SPITE OF MANY RUMORS,

Some of Which Have Basis in Fact.—Refused Iron Quickly Absorbed.—Activity in Finished Lines Continues.

The pig iron market continues to be the center of interest, and considering the number of rumors afloat, which would tend to increase any inherent weakness, remarkable strength is shown. One event which has been widely referred to in newspaper reports as an indication of weakness was the action of a large independent steel maker in refusing, on account of what it considered the excessive price, to take about 50,000 tons of Bessemer and basic pig iron on a sliding scale contract which permitted such action in case the price reached a certain point. The ease with which this tonnage, suddenly thrown upon the market, was absorbed is, however, proof of the strength of present conditions. At the time the iron was refused, one interest which makes basic iron was badly in need of iron for its customers and bought a part of the tonnage at about $22, and a large steel making interest, whose production of iron had been curtailed by the blowing out of several of its furnaces, was another buyer.

Southern Concessions. In a few centers, especially in Chicago, there is clearly a disposition on the part of some southern sellers to grant concessions, but so far there is very little change in quotations and the prospect of improving production and shipments from the south is not bright. Little business is being done in northern iron, in which the market is quiet but firm. Steel makers adhere to their policy of staying out of the market.

Iron Ore Shipments. Indications now are that shipments of iron ore from the Lake Superior ranges next season may amount to 42,000,000 tons, about 2,000,000 tons more than has been estimated. The ability of the railroads in handling ore from the mines to the upper lake docks will be an important factor in determining whether this immense tonnage can be moved. There is some apprehension of a shortage of labor on the ranges next summer.

Finished Material. In finished lines there is no diminution in the great activity which has long prevailed. In structural shapes, in which the demand has not been so strong as in most other lines, there is some improvement. In sheets and plates the mills are falling farther behind in their deliveries.

Coke and Old Material. On account of the blowing out of a number of furnaces for repairs, the coke market is somewhat easier. Scrap is irregular and dull in most centers.

Cars Ordered.—The Pennsylvania railroad and one of its constituent companies have contracted for 5,300 steel under frame box cars, 2,500 of the standard XL type going to the Pressed Steel Car Co., and 2,500 to the American Car & Foundry Co., while the former concern secured 300 special box cars equipped with ventilators for the fruit trade. The contract is the first result of the recent successful financial plans of the Pennsylvania railroad to raise money to care for the new rolling stock to meet requirements.

Will Double Its Plant.—The plant of the Union Switch & Signal Co., at Swissvale, near Pittsburg, will within a short time be doubled in capacity. The company, which is a part of the Westinghouse interests, has acquired the property of the Edgewood Golf Club, comprising about 30 acres, adjoining the present plant.

MINING MACHINERY

Is Put in Great Demand by Canadian Development.—Industrial News.

Toronto, Canada, Feb. 25.—A great demand for mining machinery has been created by the Cobalt mining boom, and of late there has been much activity in this branch of the trade. In the earlier days of the camp production was mainly carried on by primitive methods, as the ore lay near the surface, but since the era of extensive capitalizations set in, nearly all the producing mines, or those likely to become such, are being equipped with modern plants. Since last spring 56 plants have either been installed or are now under order, and with the increase of companies many more will be required as soon as spring sets in. The establishment of several smelters has also required a quantity of costly machinery. The largest industry of this kind, now approaching completion, is the smelter erected by the Montreal Reduction & Smelting Co., near North Bay on the Temiskanning & Northern Ontario railway for the treatment of Cobalt and other ores. Six buildings have been erected with 43,000 feet of floor space. Four smelting furnaces are being installed, each of 250 tons capacity, with a reverbatory of 500 tons capacity. These will be sufficient for present needs, but it is proposed ultimately to add 10 or 12 more furnaces for which provision has been made. A battery of four 150 horsepower boilers and two compound engines made from special designs by the Jenckes Machine Co., of Sherbrooke, Que., has been put in. An electrical dynamo for special concentration work made by the Westinghouse Co. weighs 60,000 pounds, and contains 480 miles of wire. The machinery already installed has cost $350,000, and a large quantity necessary to complete the plant has been ordered in the United States, England, Germany, and France, which will bring the total cost up to $1,000,000. It is intended to make the smelter as perfect in equipment as possible, machinery being provided to treat ore of all kinds by 12 different processes. J. H. Brown, a well-known mining engineer of Montreal, is manager.

Another industry of a similar nature is that of the North American Refining & Smelting Co., composed of Cobalt mine owners. The company has decided to build a smelter at Thorold, on the Welland canal, to cost $250,000.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Bessemer Pig Refused is Easily Disposed of.—No Price Cutting.

Office of THE IRON TRADE REVIEW, 521 PARK BUILDING, Feb. 27

The strength of the present situation is reflected by the total absence of price cutting. As far as finished lines are concerned, the extremely heavy specifications against standing contracts have been keeping pace with those of previous weeks and in spite of the short month February promises to eclipse any month during the past winter. The only finished line not sold up for many months to come is structural. This has been running light, but from a mill standpoint is causing no uneasiness, as steel usually taken by these mills is readily taken by other finishing mills and there is still a considerable shortage of semi-finished material.

The situation regarding steel bars has now reached an acute stage and delivery promises are about on a par with those on steel plates. If all contracts now on the books are fully specified, mills will operate uninterruptedly for the next seven months. No definite promises are being made on new business and current specifications are so heavy that the leading producers have inaugurated a system of apportionment by which their steel bar output will be divided as equitably as possible, this plan now being in operation on plate distribution.

Pig Iron.—The report that a large tonnage of Bessemer pig iron has been refused by a large consumer on account of the high monthly average price on which basis it was bought last fall, has been verified, but results reported as the outcome of this refusal have been misleading. The amount refused was 51,000 tons, but the effect of this iron being thrown on the market has scarcely been felt, inasmuch as it was readily disposed of in other directions and there is still a marked scarcity. Only one producer in the valleys had sliding scale contracts based on average monthly prices, and this furnace interest announces it has practically no iron to sell prior to July 1.

New inquiries for Bessemer and basic iron are very light and the only sale reported during the week was 500 tons of Bessemer for early March delivery at $23, valley furnace. While there is not even a remote idea at this time that Bessemer iron during the present year will drop to $20, it is understood the leading interest stands ready to take 200,000 tons if this figure is reached. Second quarter Bessemer is holding strong at $22 valley as a minimum and $21.50 for last half delivery. Northern No. 2 foundry is quoted $23 to $23.50 valley for second quarter and $21.50 to $22 for last half. Forge iron is scarce and off foundry iron is being sold in some cases as gray forge. Southern No. 2 foundry is being quoted $19 Birmingham for last half by one large interest, and $18.50 by another, but a large Southern producer is selling iron for that delivery at $18, Birmingham. For second quarter delivery we quote as follows:

Bessemer Valley	$22.00 to 22.50
Bessemer, Pittsburg	22.85 to 23.35
No. 1 Foundry, Pittsburg	23.35 to 23.85
No. 2 Foundry, Pittsburg	23.85 to 24.35
Gray Forge, Pittsburg	22.25 to 22.50
Basic, Valley	22.00 to 22.25
Basic, Pittsburg	22.85 to 23.10

Ferro-Manganese.—The ferro-manganese market in this district at the present time is more of a speculation on futures than it has been for some time past. On imported 80 per cent grade for prompt delivery, we quote $75 Pittsburg, but this figure could probably be shaded $1 on carload lots. For last half delivery we quote $70 Pittsburg. Imported 50 per cent ferro-silicon is quoted $110; 12 per cent domestic, $36; 11 per cent domestic, $35.

Steel.—The marked scarcity of semi-finished material, due to the heavy demands of finishing mills of producers, has shown no change. The only transactions reported during the week were on a fair tonnage of soft Bessemer billets for third quarter delivery at $30, Youngstown. The usual sellers of semi-finished material in this district are entirely out of the market for deliveries this side of July 1, and it is with difficulty, and only by refusing to continue old contracts as they expire that regular customers are being supplied, and then not to the extent of their full requirements. Soft Bessemer billets, 4 x 4 and larger are quoted nominally $29.50 to $30, Pittsburg, and open-hearth $31 to $32. Sheet and tin bars are quoted $30.

Skelp.—With conditions unchanged and continued heavy demand for what surplus is offered in the open market, we continue to quote the following nominal prices:

Bessemer, grooved, 1.80c to 1.85c; sheared, 1.75c to 1.80c; basic, grooved, 1.85c to 1.90c; sheared, 1.80c to 1.85c; iron skelp, sheared, 2.15c to 2.25c; grooved, 2c to 2.10c.

Muck Bar.—There has been some inquiry and one small sale of muck bar during the week under review, but the supply is very limited and on all pig metal bar we quote $37.50 to $38 and on part scrap bar $36.75, nominal.

Plates.—Mills are in such shape regarding deliveries in this district that they are practically out of the market, being sold up for at least four months and in the case of the leading interest six months. Eastern plate makers are demanding and securing from $2 to $4 premium for month or six weeks' delivery. Prices are unchanged as follows:

Tank plate ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill Pittsburg. Light plate schedule, No. 10, 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Extras on the regular plate schedule are as follows per 100 pounds: Boiler and flange steel plates 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plates on thin edges, 0.10c; under 3-16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—Considerable premium business in carload lots at from $1 to $2 above official quotations has been closed during the week, particularly in roofing. With continued heavy specifications February, although a short month, promises well to eclipse all records from the standpoint of specifications against standing contracts. Car shortages have delayed shipment and the leading interest alone has piled up at its various plants material requiring 1,000 cars which it is unable to get. No official third quarter price has been announced but considerable unsolicited business has been placed for that delivery subject to prices to be announced later. This has been done to insure delivery. Some of the independent interests have been handicapped by a shortage in their spelter

supply. We quote as follows, subject to the usual discounts:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized, Nos. 10-11, 2.65c; Nos. 12-14, 2.75c; Nos. 15-16, 2.85c; Nos. 17-21, 3.00c; Nos. 22-24, 3.15c; Nos. 25-26, 3.35c; No 27, 3.55c; No. 28, 3.75c; No. 29,, 4.00c; No. 30, 4.25c. Corrugated roofing, $1.85 per square for No. 28 painted, 2½-inch corrugation and $3.25 per square No. 28 galvanized, 2½ inch corrugation. Blue annealed sheets, No. 10 and heavier, 1.85c; Nos. 11-12, 1.90c; Nos. 13-14, 1.95c; Nos. 15-16, 2.05c.

Tin Plate.—No change is noted in this market, aside from the continued heavy specifications. As in the case of sheets, considerable unsolicited third quarter business has been placed at current prices. We continue to quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less two per cent for cash in 10 days.

Rails and Track Material.—The past week was the fifth consecutive week of light business in standard rails and the tonnage closed has been so inconsiderable as to be scarcely worth the mentioning. The new light rail business has been a little below the average, amounting to scarcely half the light rail capacity of local mills with a full supply of steel. The negotiations on by traction lines are still held up and taken all in all the week has been extremely dull. There has been no change in prices and we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $40; 12-pound, $36 to $37; 16-pound, $35 to $36; 20-pound, $34 to $35; 25 to 45-pound, $33 to $34; angle splice bars for standard sections, $1.65; spikes for forward deliveries, $2.50.

Merchant Bars.—Mill conditions as far as steel bars are concerned have reached that point where no definite delivery promises are being made on new business and the best that can be done under the most favorable conditions is from four to five months. Bar iron, while it is not moving as freely nor in as large tonnages as during the two weeks previous, is strong at prices quoted and sales are being made at 1.85c base Pittsburg, 1.60c to 1.65c base Pittsburg, plus freight to point of shipment for shipment west. We quote as follows:

Common iron bars, 1.80c Pittsburg in carload lots and over, 1.85c in less than carloads; Bessemer steel bars, 1.60c, net; plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carload lots, and 5 per cent off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Structural Material.—New structural business to mills for nearby deliveries has been light, but specifications against existing contracts are fair and several large orders have been placed for the requirements of construction companies through the year. Mills are making the full range of rollings in four to six weeks, but this will be lengthened with the opening of the spring building campaign. As was noted in these reports, some of the construction companies are short of work for quick deliveries, but most of them, particularly the smaller shops, are contracted to capacity for a long time ahead. Prices are firm and we continue to quote:

Beams and channels, 15-inch, and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.70c; angles from three to six inches inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.70c base.

Wire and Wire Nails.—The exceedingly heavy specifications against contracts for wire products continue unabated. Mills in this district are filled beyond capacity for contract periods. The trade is specifying unusually heavy in anticipation of the nearby spring demand. Prices are very firm, but unchanged, as follows:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than carloads, $2.10; painted barb wire, $2.15, for jobbers in carloads; retailers in carloads, $2.20; and less than carloads, $2.30 with 30c for galvanizing; plain wire, $1.85 for jobbers and $1.90 by carload.

Merchant Pipe.—The only large inquiry in the market at this time is 160 miles line pipe, which has not been closed. New business is very heavy and specifications exceed previous record. Delivery promises range from four to five months. The extreme jobbers' discount is now 76 base, base sizes and five; consumers' carloads base discounts are as follows:

	Steel black	galv.
⅛ to ¼ inch	66	50
⅜ inch	68	54
½ inch	70	58
⅝ to 6 inches	74	64
7 to 12 inches	69	54
EXTRA STRONG PLAIN ENDS.		
⅛ to ⅜ inch	59	47
½ to 4 inches	66	54
4½ to 8 inches	62	50
Double extra strong plain ends, ⅛ to 8 inches	55	44

Boiler Tubes.—Aside from continued heavy specifications for both locomotive and merchant boiler tubes, no change is noted in this market, aside from the advance of $4 a ton on the basing sizes, announcement of which was made last week. We quote as follows:

Boiler tubes.	Steel	Iron
1 to 1½ inches	47	47
1¾ to 2¼ inches	50	42
2½ inches	61	42
2¾ to 5 inches	65	52
26 to 13 inches	59	42

Less than carloads two points less.
2¼ inches and smaller, over 18 feet, 10 per cent, net, extra.
2¼ inches and larger, over 22 feet, 10 per cent, net extra.

Coke.—While foundry coke is in fair demand for both spot and future shipment and prices have not changed, there has been a still further softening in the prices of furnace coke due to several suspensions of shipments. Among the furnaces suspended are those of the Nittany Iron Co., Bellefonte, Pa., one furnace of the Buffalo & Susquehanna Co., and the Struthers Furnace, all out. Suspensions on coke shipments by several large interests are due to accumulation of stocks laid in in anticipation of bad weather and poor railroad facilities, which have not materialized. There are now between 100 and 150 cars of spot furnace coke on the market. We quote spot furnace coke $3.40 to $3.50, and for shipment prior to July 1, $3.20 to $3.25 and for the remainder of the year $3.10 to $3.15. Foundry coke for spot shipment or delivery before July 1 is quoted $3.75 to $3.85 and for shipment during the remainder of the year $3.65 to $3.75.

Old Material.—The scrap market continues stagnant and it is an exceedingly hard matter to get anybody interested except in the comparatively brisk movement in borings and turnings due to the demand and advanced prices in the east. The Allegheny Steel Co. during the past week bought between two and three thousand tons borings and turnings. There is no movement in heavy melting scrap. For delivery in the Pittsburg district, prompt shipment, we quote as follows:

Heavy melting scrap, $18 to $18.50;

re-rolling rolls, $20.50 to $21; bundled sheet scrap, $16 to $16.50; iron axles, $30.50 to $31; old iron rails, $23 to $23.50; No. 1 wrought scrap, $19.50 to $20; old car wheels, $24 to $24.50; low phosphorus scrap, $22.50 to $23; machine shop turnings, $15.50 to $16; axle turnings, $10 to $16.50; cast borings, $13.25 to $13.50; No. 1 cast scrap, $20 to $20.50.

Hoops and Bands.—Due to this being the tail end of the contract period, but very little new business is being done and new contracts are not expected until the beginning of the second quarter. Specifications are running about even with mill shipments and we continue to quote:

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c base, half extras as per standard steel.

CHICAGO.

Pig Iron Market Develops Some Weakness.—An Acute Stage.

Office of THE IRON TRADE REVIEW, 1362 MONADNOCK BLOCK, Feb. 26

The center of attraction is pig iron. Keen interest is displayed in every move and rumor regarding the situation. The air is full of bearish talk and authenticated reports are current that southern prices are being shaded for other deliveries besides the last half. There is no change in northern quotations, the only development of interest affecting local iron being the blowing out of the Spring Valley, Ill., furnace for the completion of some necessary repairs. It will be idle about thirty days. Scrap continues weak.

No features of unusual interest or significance have developed either in finished or semi-finished products. The only price change is in light rails, and these have been marked up $2 a ton. Specifications and new tonnage for all materials, excepting structural shapes, are enormously heavy and greatly in excess of the capacity of mills.

Some improvement is noted in structurals, and if only half the building projects under consideration reach the letting stage, the dullness in this branch will not be of long duration.

Pig Iron.—The struggle between buyers and sellers on last half requirements continues. The market has reached an acute stage and considerable uneasiness is manifested as to the final outcome. Trading is almost wholly restricted to first and second quarter requirements—and under the brisk shopping of these wants some weakness has developed in southern iron for the second quarter, furnaces having accepted several lots at less than $22 Birmingham, the long established price. Spot iron is without change in value, southern No. 2 foundry being firm at a minimum of $23 Birmingham and northern No. 2 at $27.50 Chicago.

For the last half, the market is very perplexing. On the surface it appears placid enough, but there are many agitated currents below. Backed by strong influences in sympathy with their desires and fortified by the knowledge of concessions on second quarter transactions, the bears are disposed to continue their waiting policy. The "stand-patters" on the other hand, have an important element of strength in the present sold-up condition of their furnaces and in the ability of railroads to overcome the car famine, and anticipate no marked decline as an outcome of the present deadlock. Nevertheless the schedule based on $18.50 Birmingham for southern No. 2 foundry for this delivery has been shaded 50 cents a ton in several instances, and while it is not an open price the lower quotation can still be obtained. A concession from the established valley price on basic has also been offered, but neither was a sufficient inducement to land the big orders that are pending. Local foundry iron is firm at a minimum of $23.50 Chicago for No. 2 foundry for the last half, and not even the competition of several Ohio furnaces selling in this market at $23.30 has succeeded in breaking this price.

Lake Superior charcoal continues strong at $27.50 Chicago for spot shipment, and $26.50 for the entire first half. Quotations below are for the last half, those for southern irons being on the basis of a $4.10 freight rate.

Lake Superior charcoal	$25.50 to 26.50
Northern Foundry No. 1	24.00 to 24.50
Northern Foundry No. 2	23.50 to 24.00
Northern Foundry No. 3	23.00 to 23.50
Northern Scotch Foundry	24.00 to 24.50
Ohio Strong Softeners No. 1	23.30 to 23.80
Ohio Strong Softeners No. 2	22.80 to 23.30
Southern Foundry No. 1	22.60 to 23.10
Southern Foundry No. 2	22.10 to 22.60
Southern Foundry No. 3	21.60 to 22.10
Southern Foundry No. 4	21.10 to 21.60
Southern No. 1 Soft	22.60 to 23.10
Southern No. 2 Soft	22.10 to 22.60
Southern Gray Forge	19.60 to 21.10
Southern Mottled	19.10 to 19.60
Southern Silveries 4 per cent to 6 per cent Silicon	24.60 to 25.10
Jackson Co. Silveries, 8 to 10 per cent Silicon	29.30 to 30.30
Malleable Bessemer	23.50 to 24.00

Billets and Rods.—The pressure for crude steel is unbated. Considerable western business is placed with Pennsylvania mills because of the scanty offerings of Chicago producers. The former are asking on the basis of $34 at the mill for forging billets, netting between $37 and $38 Chicago, the range of prices asked by local makers. Wire rods continue scarce and are firm at a minimum of $37 Pittsburg.

Iron and Steel Bars.—There is a total absence in the market of any element that might be construed as reflecting upon the strength of the situation. Specifications for steel bars are unusually free, but deliveries continue very slow. The congestion of business on mill books is so great that little hope is expressed that existing contracts will be completed within the time specified. The movement in bar iron is promising, fabricators contracting for liberal tonnages and taking all the material they can get. Producers are firmly maintaining prices at a minimum of 1.65c Pittsburg. This quotation is obtainable only on desirable business; for small lots, or for quick shipments, from $1 to $2 a ton higher is asked. We quote for Chicago delivery, as follows:

Hard steel angles, 1.75c; soft steel bars and bands, 1.76½c, half extras; soft steel angles less than 3 x 3, 1.86½c; hoops, 2.16½c base, full extras. We quote bar iron from stock 2.25c; full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2, half extras; soft steel hoops, 2.40c to 2.50c, full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Plates:—No diminution is noted in the volume of business placed with mills. The week's tonnage was greatly augmented by a large contract from a local jobbing interest. The congestion on the books of the leading producer is unrelieved. Six months is the best delivery it can make on sheared plates, while nine months is required for the shipment of universal sizes. Independent interests, however, are offering deliveries of both products within ten days on the basis of 1.80c Pittsburg. Prices are without change as follows:

Plates ¼ inch and thicker 6⅛ to 100 inches wide, either universal or sheared, 1.70c Pittsburg base. For extras, see Pittsburg report. Freight rate to Chicago, 16½c per 100 pounds. Jobbers' price for shipment from local stocks are as follows: Tank steel ¼ inch and heavier up to 72 inches wide, 2.30c; 3-10 inch up to and including 60 inches wide, 2.30; 3-16 inch 72 inches wide, 2.55c; No. 8 up to 60 inches wide, 2.35c. Flange steel, 25c extra; heads, 25c extra.

Sheets:—The local situation is with-

out appreciable change. Demand is undiminished, and premiums are occasionally being obtained for quick shipments. Specifications are continually in excess of capacity, resulting in the entire output of every mill going into immediate consumption. We quote carload lots, as follows:

Black sheets Nos. 8, 9 and 10, 1.90c Pittsburg; No. 28 gage, 2.60c Pittsburg Galvanized sheets No. 28 gage 3.75c Pittsburg. Freight to Chicago 16½c per 100 pounds. Jobbers' prices on less than carload lots from store are as follows: No. 10, 2.25c to 2.30c; No. 12, 2.30c to 2.35c; No. 14, 2.35c to 2.40c; No. 16, 2.45c to 2.50c; Nos. 18, 20, 2.70c to 2.80c; Nos. 22, 24, 2.75c to 2.85c; No. 26, 2.80c to 2.90c; No. 27, 2.85c to 2.95c; No. 28, 2.95c to 3.05c; No. 30, 3.35c. Galvanized sheets, Nos. 10 to 20, 3.40c to 3.45c; Nos. 22 and 24, 3.55c to 3.60c; No. 26, 3.75c to 3.80c; No. 27, 3.95 to 4c; No. 28, 4.15c to 4.20c; No. 30, 5.35c to 5.40.

Structural Steel:—Plans for the new depots to be erected by the Chicago & Northwestern and Pennsylvania railways are sufficiently far advanced to give an idea of the amount of steel that will be required in each. The North Western depot, it is said, will require between 12,000 and 15,000 tons, and the Union depot between 15,000 and 20,000 tons. Work on both projects will be started this summer, although the steel for neither will be required before the spring of 1908. The Union depot will be built by the Pennsylvania lines, and the contract for the steel will doubtless go to the Cambria Steel Co. New tonnage placed with local mills shows an increase over previous weeks, but there is no improvement in the volume of specifications. The only contract of importance let this week was for the Lehigh Valley coal dock at South Chicago, 2,500 tons, which was awarded to the Morava Construction Co. Prices are without change, as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from that city to Chicago is 16½c per 100 pounds. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.05 to $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base, beams, three inches to 15 inches, inclusive, $2.05 to $2.10 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base. Less than carload lots are $2 a ton higher than foregoing price.

Rails and Track Supplies.—Traction and industrial interests have placed several desirable contracts for heavy sections in the past week. The crowded condition of mills compels late deliveries on these orders. No bookings have been made for 1908 shipment, although inquiries continue to be received. Light rails are in good demand. Prices of these have this week been moved up. We quote as follows:

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $35, 25-pound, $36; 20-pound, $37; 16-pound, $38, 12-pound, $39, and lighter sections down to 8-pound, $45.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. Angle bars in large lots are quoted 1.65c to 1.75c; for smaller quantities, 2.25c to 2.75c; spikes, large lots, 2.30c, for smaller quantities, 2.50c; bolts, large lots, 2.65c to 2.75c; smaller lots, 2.85c with square nuts, and 3c with hexagon nuts.

Merchant Steel.—Makers report that they are making some headway on deliveries, but they are still from eight to ten weeks behind on orders. Prices are as follows:

Planished or smooth finished tire steel, 1.96½c; iron finish, up to 1½ x ½ inch, 1.91½c base; iron finish, 1½ x ½ inch and larger, 1.76½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.26½c, and 1⅛ inch and larger 2.16½c; smooth finished machinery steel, 2.16½c; flat sleigh shoe, 1.81½c; concave and convex sleigh shoe, 2.06½c; cutter shoe, 2.35c; toe calk steel, 2.31½c; railway spring, 1.96½c; crucible tool steel, 6½c to 8c, with higher prices asked on special grades. Shafting is very strong. Quotations are without change at 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Cast Iron Pipe.—A contract for 2,500 tons has been awarded by the city of Duluth to the United States Cast Iron Pipe & Foundry Co. Orders for lots ranging between 100 and 500 tons are very plentiful. Prices for Chicago delivery are firm as follows: Four-inch water pipe, $38.60; 6 to 12-inch inclusive, $37.60; 16-inch and upward, $1 a ton less; gas pipe $1 a ton higher on all sizes.

Merchant Pipe.—The demand from the jobbing trade is unusually heavy, and mills are congested with tonnage. Deliveries continue slow. We quote as folows: ¾ to six inches black steel pipe, 74.35 per cent discount; galvanized, 64.35 per cent discount. From store in small lots, Chicago distributors are asking 72½ per cent discount on the base sizes.

Boiler Tubes.—Since the advance of a week ago was announced, the movement in tubes has increased. Prices are firmly maintained on the new basis, as follows: 2¾ to five inches, steel, 63.35 Chicago; iron, 50.35; seamless, 50.35. On less than carload lots from store, we quote 60 off for steel; 47½ for iron, and 47½ for seamless.

Wire Products.—The weather of the last two weeks has lent itself to increased consumption of wire products. Jobbers' stocks have diminished rapidly and mills have been called upon for increased shipments. As a result of the steel shortage, these have not always been forthcoming as promptly as might be desired, and some embarrassment has resulted. The market continues very active, and prices are firmly upheld. We quote to jobbers, Chicago delivery, as follows:

Wire nails, $2.15; painted barb wire, $2.30; galvanized barbed wire, $2.60; smooth annealed wire, $2.30; polished staples, $2.55. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Old Material.—No material change is noted in the scrap situation. Demand is light and transactions are few. Prices are weaker, but not enough to induce much movement. We quote as follows, gross tons being given in the first paragraph:

Old Steel Rails (4 feet and over)	$19.00 to 19.50
Old Steel Rails (less than 4 feet)	18.00 to 18.50
Old Car Wheels	23.00 to 23.50
Old Iron Rails	25.00 to 26.00
Light Section Relayers, 45 lbs. and under, subject to inspection	30.00 to 32.00
Relaying Rails, subject to inspection	31.00 to 32.00
Frogs, Switches and Guards	16.50 to 17.00
Heavy Melting Steel	16.00 to 16.50
Mixed Country Steel	12.50 to 13.00

We quote net tons as follows:

No. 1 R. R. Wrought	$15.25 to 15.50
No. 2 R. R. Wrought	14.25 to 14.50
Shafting	17.00 to 17.50
Dealers Forge No. 1	12.00 to 12.50
Wrought Pipe and Flues	11.50 to 12.00
No. 1 Cast, 150 pounds and less	17.50 to 18.00
No. 1 Mill	10.50 to 11.00
Mixed Busheling (No. 1 & No. 2)	11.00 to 11.50
Country Sheet	8.50 to 9.00
No. 1 Boilers Cut	11.50 to 12.00
Boiler Punchings	15.00 to 16.00
Iron Car Axles	26.50 to 27.00
Steel Car Axles	21.00 to 21.50
Iron Axle Turnings	11.00 to 11.00
Cast Borings	8.50 to 9.00
Mixed Borings, etc	8.50 to 9.50
Machine Shop Turnings	11.00 to 11.50
Railroad Malleable	16.00 to 16.00
Agricultural Malleable	15.00 to 15.05
Stove Plate and Light Cast Scrap	14.50 to 15.00
Old Iron Splice Bars	20.00 to 21.50

Coke.—The feature of greatest interest in the local market is the announcement made by this review last week that the United States Steel Corporation is planning the erection of 400 by-product coke ovens at its Joliet plant to supply the blast furnaces there with their fuel requirements. This move is of far-reaching importance, for should the installation prove a success, the other plants of the Steel Corporation in the west will be similarly equipped. Since by-product coke was first placed on the market.

in this territory, it has gradually supplanted the Connellsville product for both furnace and foundry use. The fact that it is not more widely used is because the capacity of the local ovens is not sufficient for the demand. Prices of both Connellsville and West Virginia grades are without change, ranging from $3.85 to $4 ovens for early delivery, and from $3.75 to $3.85 for forward shipment. By-product coke is firm at $6.90 to $7.15 Chicago.

CLEVELAND.

Forty-two Million Tons of Ore May Be Mined Next Season.—Demand for Spot Iron.

Office of THE IRON TRADE REVIEW, Browning Building, Feb. 26.

Iron Ore.—Observers in close touch with the ore situation now state that unless there is a labor shortage on the ranges the mines can easily produce 42,000,000 tons for shipment during the next season. There will be no difficulty in the vessels carrying this immense tonnage, but it is doubted whether the railroads would be able to haul so much from the mines to the docks. There would have been a considerably larger shipment last season had the railroads been able to haul all that would have been mined. In the case of one large mine on the Mesabi, there was a shortage of 25 per cent of the expected production, due entirely to inability of the Great Northern to furnish cars. The railway service improved toward the close of the season. The movement from docks to furnaces is not very heavy at present. The only ore being sold now consists of limited amounts released by furnaces which have found that they will not need all the ore on docks before the opening of navigation. Sellers find no difficulty in disposing of ore thus released. The outlook is that there will be no serious labor question to trouble the vessel owners at the opening of navigation. The unions of seamen and firemen are the only labor organizations to be dealt with and negotiations with them will not be taken up until about the first of April.

Pig Iron.—The increased demand for spot iron has been the interesting feature of the past week. Very little of this iron can be had and for the little obtainable the price is about $26 at the furnace for No. 2. The market has not been active for future delivery, and about the only sale of consequence was 4,000 tons to the leading pipe interest for second quarter delivery at about $23. Buyers of steel-making iron are standing pat on their position of $20 iron or none. No transactions are reported. We quote, f. o. b. Cleveland, as follows for last half delivery:

Bessemer	$21.00 to 21.50
No. 1 Foundry	22.50
No. 2 Foundry	22.00
No. 3 Foundry	21.50
No. 2 Southern	22.60 to 22.85
Gray Forge	20.00 to 20.10

Coke.—The coke market is somewhat easier on account of a number of furnaces being banked, but prices show little change; strictly Connellsville furnace coke for prompt delivery being quoted at $3.50 to $3.65 and foundry coke at $3.85 to $4.00 at the ovens.

Finished Material.—Rumors of railroads curtailing their purchases have not developed into anything definite and the demand from all classes of buyers continues very strong. Mills are falling farther behind in their deliveries. On sheets the leading interest seldom does better than 20 weeks. On structural material the demand is improved and some independent interests have booked a considerable tonnage within a few days, giving delivery in from five to six weeks. The plate situation continues strong, prompt delivery being obtainable only at high premiums. The market in both iron and steel bars is strong.

Old Material.—The condition of the market may be described as indifferent, as it is neither good nor bad. There is no particular anxiety on the part of prospective purchasers to close contracts, but better times are expected as the year advances on account of the general prosperity of the country. Foundry scrap remains strong, but there is no change in quotation. Turnings and borings are in steady demand and prices are rising. Advances of 50 cents and $1 respectively are shown in these grades. We revise our quotations and quote, f. o. b. Cleveland, gross tons, as follows:

Old iron rails	$25.00 to 26.00
Old steel rails (re-rolling)	18.50 to 19.50
Old steel rails (under 6 feet)	18.50 to 19.50
Old car wheels	21.50 to 22.00
Steel boiler plate	13.50 to 14.00
Steel axles	21.50 to 22.50
Malleable iron (railroad)	18.50 to 19.00
Malleable iron (agricultural)	15.50 to 16.00
Heavy steel	17.00 to 17.50
Country mixed steel	14.50 to 15.50
Low phosphorus	23.00 to 24.00

We quote net tons as follows:

No. 1 R. R. wrought	$17.00 to 18.00
No. 1 busheling	14.50 to 15.00
No. 1 machine cast	18.00 to 18.50
Iron axles	25.50 to 26.00
Axle turnings	13.50 to 14.00
Wrought turnings (free from cast)	12.50 to 13.00
Grate bars	14.00 to 15.00
Pipes and flues	13.50 to 14.00
Tank iron	12.00 to 13.00
Hoop and band iron	8.50 to 9.00
Sheet iron	7.50 to 8.50
Wrought drillings	12.50 to 13.00
Stove plate	14.00 to 15.00
Cast borings	10.00 to 10.50

CINCINNATI.

Sale to Implement Interest.—Furnaces Firm in Their Views.

February 26.

Pig Iron.—The market was quiet again the past week, with no change in prices. The situation may be described as the usual waiting spell which takes place between buying movements. Furnaces are firm in their views and there is but little talk of shading of quotations. In this respect the market is steadier than last week. It is probable that in a few isolated cases $18.00 Birmingham is put through for last half iron, but this price is practically not a quotable figure this week, and several fair sized orders have been booked under competition at $18.50 and this is regarded as the market.

There has been no improvement in the movement of iron from the south, and spot iron continues to command $23.00 Birmingham when it is actually in transit; otherwise it is not to be regarded as spot, as the delays in getting it loaded and forward make it of no value as an immediate delivery proposition.

There is but little being done in the second quarter for either northern or southern iron, and this delivery is almost out of interest.

A sale of malleable iron for deliveries commencing with March and running through the year to a large manufacturer of agricultural implements was reported to have been made during the week, but the price was not made public. The belief in the trade is that it went at some price under $21.00 at Ironton, but this is not confirmed.

Northern foundry iron is held at $21.00 to $21.50 at furnace for last half delivery in the Ironton district and southern Ohio with no business of importance being done.

Buyers are not inclined to place orders for the last half under the belief that it will pay them to take the chance of waiting. Furnace interests are not urging sales agencies to make sales and express confidence in higher prices when the middle of the year arrives. They are regarding business taken on the present basis merely as "back log" orders. We quote spot iron delivered at Cincinnati as a basis for settling contracts based on our quotations as follows:

Southern foundry No. 1	$26.50
Southern foundry No. 2	26.00
Southern foundry No. 3	25.00
Southern foundry No. 4	23.50
Southern foundry, No. 1 soft	26.50
Southern foundry, No. 2 soft	26.00
Gray forge	$21.50 to 22.00
Northern foundry No. 1	26.65 to 27.75
Northern foundry No. 2	26.15 to 27.15
Northern foundry No. 3	25.65 to 26.65
Jackson County silvery, 8 per cent	31.15

In considering the matter of prices for the last half, the question of transportation has an important bearing. It has been suggested that, if the accumulation now on hand at the furnace yards in the south could be moved in the next three months, together with the iron under regular contract for the same period,

consumers would have a supply of iron that would carry them well into the third quarter of the year. This would mean lower prices for spot iron and would have a tendency to cause buying to halt, possibly long enough to depress prices. This suggestion, however, from present indications, is not likely to be realized, as railroads appear to be unable to make any headway in relieving the situation. We quote last half delivery, delivered Cincinnati as follows:

Southern Foundry No. 1	$22.00 to 22.50
Southern Foundry No. 2	21.50 to 22.00
Southern Foundry No. 3	21.00 to 21.50
Southern Foundry No. 4	20.50 to 21.00
Southern Foundry No. 1, soft	22.00 to 22.50
Southern Foundry No. 2, soft	21.50 to 22.00
Gray Forge	19.50 to 20.50
Northern Foundry No. 1	22.65 to 23.15
Northern Foundry No. 2	22.15 to 22.65
Northern Foundry No. 3	21.65 to 22.15
Jackson County Silvery, 8 per cent	30.15 to 31.15

Coke.—The market is quiet and there is an easy feeling, but quotations are unchanged. There is no contracting for forward delivery and the little business done is in prompt shipment coke. Prices in the leading coke producing districts are as follows:

Wise County, Va. Furnace Coke prompt shipment	$3.25 to 3.50 per ton
Wise County, Va. Foundry Coke	4.00 to 4.50 per ton
Pocahontas Furnace Coke prompt shipment	3.25 to 3.50 per ton
Pocahontas Foundry Coke	3.50 to 4.00 per ton
Connellsville Furnace Coke prompt shipment	3.25 to 3.50 per ton
Connellsville Foundry Coke	4.15 to 4.50 per ton
New River Foundry Coke on contracts	3.50 to 4.00 per ton
New River Furnace Coke, prompt shipment	2.75 to 3.00 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.70 to $1.75 per ton on $9.00 pig iron, plus 19 to 20 per cent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The market is firm at last week's revised quotations, with a fairly good demand. We quote f. o. b. Cincinnati as follows:

Old No. 1 railroad wrought, net tons	$17.50 to 18.50
Cast machine and foundry, net tons	18.50 to 19.00
Old iron rails, gross tons	25.50 to 26.50
Old steel rails, gross tons	19.00 to 20.00
Old short lengths, gross tons	18.00 to 19.00
Old iron axles, net tons	26.00 to 26.50
Heavy melting scrap, gross ton	20.00 to 21.00
Stove plate, net tons	14.50 to 15.00
Wrought turnings, net tons	12.50 to 13.00
Cast borings, net tons	9.50 to 10.00
Car wheels, gross tons	21.50 to 22.00

Finished Material.—There is a good run of orders from store and retailers are declining orders at anything under full prices. We revise quotations on some lines to a higher basis. Retail orders are filled at the following quotations:

Angles 3 x 3 and over, 2.15c to 2.25c; beams and channels 15 inches and under, 2.15c; small angles and architectural channels, 2.10c base; plates ¼ inch and heavier, 2.10c; 3-16 inch, 2.20c; No. 8, 2.20c; sheets (blue annealed) No. 10, 2.30c; No. 12, 2.35c; No. 14, 2.40c; No. 16, 2.50c; box annealed sheets, Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.75c; Nos. 25 and 26, 2.80c; No. 27, 2.85c; and No. 28, 2.95c. Iron and steel bars, 2.00 base; boiler tubes, 60 per cent off base; turn buckles, 45 per cent off; rivets, 3.15c base; cold rolled shafting, 45 per cent off list; steel tire, 2.10c base.

PHILADELPHIA.

Decreased Railroad Buying Not Apparent.—More Foreign Iron.

February 26.

Pig Iron.—Interest centers about the attitude taken toward prices during the last half of the year. Some furnace men refuse absolutely to make any concessions from the prices they have fixed for that period, while others are willing to shade a bit, especially if the transaction covers the last quarter. It is well known that a number of very large interests have not as yet covered their requirements for the last half, and the situation has developed into a sort of waiting game between these consumers and the producers as to who can hold out the longer and whose judgment as to the future is the right one. So far as this local territory is concerned, no signs of real weakness have appeared. So comparatively little southern iron comes into this market that it is almost a negligible quantity, and Pittsburg's agitation over the prices of Bessemer has had little effect here. English iron continues to arrive in considerable quantities, no less than four cargoes being due at this port last week and this. Purchases abroad insure shipments of this foreign iron up to May 1, and if the situation here retains its present strength Middlesboro brands will doubtless be imported throughout the summer. Undoubtedly this English and Scotch iron has had a most important effect in keeping prices at their reasonable figures, and as long as it continues to arrive freely there can be no marked advance. No large orders have been noted during the past week, and there has been no important change in prices. Spot deliveries of No. 2x foundry bring from $25.50 to $26.00, and basic $25.00. For the last half there has been little done. In some quarters there has been a little easing up, but it should not be inferred from this that any general concessions have been made, for such is not the case. Prices for the last half may be quoted about as follows:

No. IX Foundry	$25.75 to 26.25
No. 2X Foundry	23.50 to 24.25
No. 2 Plain	23.00 to 23.50
Standard Gray Forge	22.00 to 22.50
Basic	23.25 to 23.75
Low Phosphorus	27.00 to 27.50

New Material.—There is excellent business in all lines of finished products, with plates leading in activity. Some mills in eastern territory report orders ahead for a full year, running into 1908, with specifications in hand for six months' work. No serious attention is paid to the railroad talk of a slackening in business, of which there are no signs in the mills. Prices remain unchanged as follows: Beams, channels and angles, according to specifications, 1.83½c to 2c; refined iron bars, 1.89½c to 1.93½c; steel bars, 1.83½c to 1.88½c; plates, 2.13½c to 2.18½c.

Old Material.—Steel scrap is up 50 cents a ton, and such changes as are reported indicate improvement, but the market as a whole is rather quiet, though stronger in tone. There is such activity in the mills that a vigorous demand is looked for soon, with rising prices. For the present these may be quoted as follows:

Old steel rails	$19.50 to 20.00
No. 1 steel scrap	18.50 to 19.00
Old steel axles	22.00 to 22.50
Old iron axles	30.00 to 31.00
Old iron rails	26.50 to 27.00
Old car wheels	23.00 to 24.00
Choice scrap, R. R. No. 1 wrought	20.75 to 21.25
No. 1 yard scrap	18.75 to 19.25
Machinery scrap	22.50 to 23.00
Low phosphorus scrap	22.50 to 23.00
Wrought iron pipe	16.50 to 17.00
No. 1 forge fire scrap	17.00 to 17.50
No. 2 forge fire scrap, ordinary	11.50 to 12.00
Wrought turnings	16.75 to 17.25
Axle turnings, heavy	17.25 to 17.75
Cast borings	14.50 to 15.00
Stove Plates	16.75 to 17.25

BUFFALO.

Rumors of Railroad Curtailment Do Not Cause Alarm.

February 25.

Pig Iron.—A firm condition prevails in this market with a very strong demand for prompt and forward deliveries. Prices continue steady with no change in either direction. Business generally is reported light, said to be due to restless financial conditions, especially in the east. Most of the selling is for last quarter delivery, but there is still iron for third quarter. Straggling shipments of prompt are reported, but there is great difficulty now in getting shipments out of this district. One furnace has a long string of cars loaded with pig which has been ready for shipment for three weeks, several cars for nearly four weeks, and it has been impossible to start the tonnage This is probably the most embarrassing feature here. The urgent demand for delivery makes the consumer and producer alike uneasy. Railroads have been urged to forward shipments quickly, but so far about all they have been able to do is to offer promises for better conditions later on.

Foreign iron is finding a market here in a small way. Shipments of Scotch and English iron have been received within the week closed. Valley iron is also coming in and has had a good sale owing to the scarcity of the local product. A number of large shipments of valley iron for prompt delivery have been placed.

Interest in the pig iron market has not diminished. Speculation as to the future of the market is rife. Reports that transportation companies would

curtail their expenses and do less buying, building, and track laying has been given considerable thought, but those in a position to know something of the relations between Wall street and the railroad corporations say they find no ground for the belief that a depression in the iron business will ensue. There is a marked confidence that prices will hold firm and that there will be a good market for all the output of all local furnaces. The contention is made here that the prosperous conditions of the country, the necessity for better railroad facilities to meet the demands of the shipping public, and the tremendous amount of freight traffic generally, removed all possibility of a decreased demand for iron for construction and equipment purposes. It is predicted that the consumers who hold back their orders for future deliveries, thinking that a depression will ensue which will cause a drop in prices, will become convinced to the contrary and that there will be an almost unprecedented rush for pig iron.

We quote for the last half delivery as follows:

No. 1 X Foundry	$22.75 to 23.25
No. 2 X Foundry	22.25 to 22.75
No. 3 Foundry	21.50 to 22.00
No. 2 Plain	22.00 to 22.50
Malleable Bessemer	22.50 to 23.00
Gray Forge	21.50 to 22.00
Charcoal	26.00 to 27.00

BIRMINGHAM, ALA.

Quotations on Pig Iron Firm.—Railroad Situation Improving.

February 25.

Birmingham quotations of pig iron are firm, withstanding a strong assault. No. 2 foundry iron, delivery during the last half of the year, is not selling under $18 per ton, almost all of the business now going on the books being at $18.50 per ton. The manufacturers are not on the defensive, their order books placing them in a position to be able to sit by and let all the talk go on in regard to a reduction in prices. Representatives of several iron buying and selling firms throughout the country were in the Birmingham district recently investigating conditions in this section and during their stay here rumors prevailed that there would shortly be reductions in prices.

A few small lots of spot iron sold during the past week at $23 per ton, No. 2 foundry. The aggregate business of this kind transacted, however, was not very extensive. Charcoal iron is selling at $27.

The make in this section has not improved any lately and as far as can be seen there will be no improvement in the near future. The railroads are doing a little better in the way of moving out the iron and it is now believed that the month's shipments will equal that of January though this month was shorter by three days than the previous month. The higher officials of some of the larger railroad systems were in this district recently and promised to give better accommodations to the manufacturers. Indications point to an effort being made to carry out the promises. The advance in freight rates will go into effect next Sunday. There will be quite a large amount of accumulated iron on the furnace yards in this territory at the end of this month, notwithstanding efforts to clear the deck. The manufacturers hope for no further delay in the advance in freight rates.

Announcement is made that more departments in the Birmingham rolling mills will be started up shortly. Efforts are being made to bring a number of rolling mill men down south from northern mill districts. Conditions in finished iron and steel are favorable.

BRITISH IRON MARKET.

Improved Tone Noticeable.—Great Demand for Sheets.

Office of THE IRON TRADE REVIEW.
Prince's Chambers, Corporation St.,
Birmingham, Eng., Feb. 13.

There is a good deal of uneasiness over the present condition of the iron trade, but, on the whole, the tone has improved during the last fortnight. So far as can be ascertained, the fall in demand was solely due to the drop of five or six shillings in Cleveland iron. Apparently, the depressing influences are passing away, or at least are less operative. There was a recovery yesterday in Cleveland iron of 1s 1d, the quotations being £2-16-7 ($13.84), and No. 3 £2-17-0d ($13.94) to £2-17-3d ($13.97) for merchants. Makers were not offering iron, owing to their belief that the arrival of spring will increase the strength of the market, and it is believed that there will be a big demand on the continent. On the other hand, buyers are equally shy, owing to recent fluctuations, so that actual business is at a minimum. In the meantime stocks steadily reduce, business at Glasgow yesterday totaling 10,000 tons. Connal's stores at Middlesbrough reduced from 504,177 tons on Saturday to 501,302 tons on Monday. The prevalent feeling in the trade is well expressed by a Barrow trade correspondent of a Birmingham paper, who wrote, about a week ago: "It has been difficult to understand for some weeks past the influences at work in bringing down the value of hematite iron, because instead of there being any cause for depreciation in value, the very opposite was the fact. It now transpires that the 'bearing' operations in warrant iron were undertaken by American buyers, who have since placed heavy forward orders at lower prices than have been ruling. Makers continue to quote 81 shillings per ton. They are well sold forward; there is a full demand on home, continental and foreign account, and the prospect is generally admitted to be one which, before the year has advanced far, will lend itself to a higher plane of values. The same influences have been at work in other districts."

The general feeling now seems to be that undue importance has been attached to recent "bearing" influences. At the same time it has undoubtedly checked buying in the Midlands. Coincident with this, however, is the remarkable scarcity of metal. Smelters are being worried for deliveries, users being in most serious straits for metal to keep furnaces and cupolas in operation. Some places must have stopped altogether, if the dealers had not forwarded mere handfuls of metal to keep them going. In regard to finished iron, there has been more buying, and the sheet trade is enormous.

There is a great run on steel sheets, this branch maintaining great firmness owing to the scarcity of billets. There is a big demand, also, for wire of all sorts. The hands of finished iron makers have been strengthened by the advance in wages resulting from the wages board ascertainment just announced of selling prices during November and December. This showed an increase from £6-17-5.01 to £6-18-9d.81. The smallness of this increase has caused surprise, in view of the general belief that the prices of unmarked bars had greatly improved. The only explanation, of course, is that old contracts are not yet worked out. Bars have increased from £6-17-5d.47 to £6-18-7d.78, angles and tees from £7-2-2.31 to £7-2-3d.83, plates and sheets from £7-15-9.12 to £7-18-4.38, and hoop, strip, and miscellaneous from £6-12-11.13 to £6-14-9d.61. The slight increase is sufficient to carry an advance of 3d. in puddling, and 2½ per cent for millmen. From the point of view of the relation with the north, the rise in wages is considered satisfactory, even by many ironmasters, who have regarded the recent position as very unwholesome. The two districts have been on a level, whereas, as has been pointed out before in this column, the Midland puddler should earn 6d. more than his confrere in the north. The difference is now 3d., and the temptation to migrate, respecting which the employer expresses concern, is to this extent reduced. But the increase in wages further narrows the margin between cost and selling price, and ironmasters complain that they are being rather tightly

pinched. Add to this a very decided upward movement in coal, which has gone up quite 3 shillings since the beginning of the year, and is likely to go further, and it will be seen that ironmaking is anything but a gold mine. There are great complaints about short coal deliveries, owing to defective canal traffic, and scarcity of wagons.

ST LOUIS.

Buyers of Pig Iron Still Hesitate and the Market is Dull.

February 26.

Pig Iron.—The week closes under practically the same conditions which characterized the market last week. There has been the usual volume of small orders for spot shipment, owing to the failure of southern roads to make deliveries, but buyers are still holding off for last half. Inquiries for this period are comparatively few and of that order which plainly stamps them as feelers.

Dull and quiet are the terms to apply to the market today. Prices remain unchanged, both for spot shipment and for future delivery. Twenty-three dollars is commonly quoted for No. 2 southern, $20 to $21 for second quarter and $18.00 to $18.50 for last half. There is a report current that one agent had offered iron on the basis of $17.50 Birmingham for last half, but this was not verified. If such a quotation should be made, it hardly represents the market, as furnaces feel too secure in their position to figure on such a basis that far ahead. Eighteen dollars is the common quotation.

Purchases for the week ran from carload lots to 1,000-ton orders. No large tonnages were booked, those large buyers who have been in the market still holding off for developments.

Some little improvement is noted in the car situation, but not enough to be very noticeable—not enough yet to have any influence on the spot market, which it is conceded will drop off as soon as the iron under contract begins to move freely. Where some houses have been getting one car they are now getting two, but that is all. It will require several months to clear the yards at the present rate. It is generally believed that the railroads will do better when spring opens. There has been some talk of the roads again postponing the date on which the southern advance goes into effect, on account of the little relief afforded, but it is now believed that the railroads are firmly resolved to stand on the 25-cent advance beginning March 3.

Our quotations, including the new freight rate of $3.75 from Birmingham to East St. Louis, range as follows:

Southern No. 1	$26.75 to 27.25
Southern No. 2	26.25 to 26.75
Southern No. 3	25.25 to 26.25
Southern No. 4	24.25 to 25.25
Gray Forge	23.75 to 24.25

Coke.—Coke is easier on account of a much freer movement of cars, but a fair volume of business is being done. The quotation runs from $3.90 to $4.15 Connellsville basis, depending upon delivery.

NEW YORK.

Pig Iron Quiet, but Prices Firm.—Improvement in Structural Material.

Office of THE IRON TRADE REVIEW.
ROOM 1315, No. 150 NASSAU ST., Feb. 26

Pig Iron.—The eastern market is extremely quiet, partly because of the double holiday incident to Washington's birthday and chiefly through the pronounced disposition of consumers to play the waiting game. At the same time, prices are very firm, occasional sales being recorded at full quotations, and in isolated instances furnaces have announced slight increases. There is increased activity in second quarter iron, but beyond that date trading is practically at a standstill. The foreign iron movement, it is stated, is practically over, and none of the unsold tonnage yet to be received will be allowed to go upon the open market. For the month the volume of business has been very fair; the total sales of a large selling house in this district have been considerably in excess of those for February, 1906, though, of course, less than those of January last. We quote tidewater prices, last half delivery, as follows:

Northern Foundry No. 1	$24.00 to 25.00
No. 2 Foundry	23.50 to 24.50
No. 2 Plain	23.00 to 24.00
No. 1 Southern Foundry	22.50 to 23.00
No. 2 Southern Foundry	22.00 to 23.00
No. 3 Southern Foundry	21.50 to 22.00
No. 4 Southern Foundry	21.00 to 22.00

Finished Material.—Considerable improvement is noted locally in structural work, and a large tonnage is in prospect. It is axiomatic that as railway construction work becomes easier, activity in building lines increases, and this is proving true in the present instance. The American Bridge Co. has taken 3,500 tons of materials for the Grand Trunk system, to be used in the construction of shop buildings, 500 tons for a store building at Bridgeport, Conn., and over 500 tons for a building at Salt Lake City. The New York, New Haven & Hartford has closed with another interest for 1,800 tons of bridge materials, but the Erie requirements have not yet been covered. The steel for the Manger building in this city will be furnished by a local fabricating shop, but two other local building operations have not yet been contracted for. Bar iron is active, new business being of good volume with specifications on existing contracts extremely heavy, in some cases including anticipations for two months. Prices are unchanged. The inquiry for cast iron pipe is not heavy at present, though a few contracts in this district are pending. The plate market is not active. Occasional sales of billets are reported, certain producers of steel preferring to dispose of their product in this shape rather than to work it up and compete in the structural market with prices at their present level. Locally billets are selling at higher than $30.

Old Material.—The scrap market is irregular, with a number of lines exceedingly firm, particularly in the case of cast scrap. Wrought scrap is active and steady. No large sales are reported, but there is an active demand for most of the items listed below. We quote tidewater prices as follows, gross tons:

Old iron rails	$24.00 to 25.00
Old steel rails, long lengths	19.50 to 20.00
Old steel rails, short pieces	16.50 to 17.00
Relaying rails	28.00 to 29.00
Old car wheels	21.50 to 22.00
Old iron car axles	28.50 to 29.50
Old steel car axles	21.00 to 21.50
Heavy melting steel scrap	16.25 to 16.75
No. 1 railroad wrought scrap	20.00 to 20.50
Iron track scrap	17.50 to 18.00
Wrought pipe	14.50 to 15.00
Cast borings	11.50 to 12.00
Wrought turnings	14.50 to 15.00
Heavy Cast Scrap	18.50 to 19.00
Railroad Malleable	18.00 to 18.50
Agricultural Malleable	16.00 to 17.00
Stove Plate	16.50 to 17.00

Metal Market

CHICAGO.

February 25.

Vigorous demand for all metals has kept the prices up. No changes have occurred in the past week except a slight tendency of pig tin to advance to its former price. The price of sheet zinc which advanced $2 a ton last week has continued at the higher figure. Copper is quoted at 26¼c for casting and 27c for lake. Pig tin is held between 44½c and 45c depending on the quantity bought. Sheet zinc is 8.50c LaSalle in car lots of 600 pound casks. Spelter sold for 6.90c. Lead desilverized sold between 6.50c and 6.60c for fifty ton lots and corroding at 7.25c to 7.35c. Carload lots 2½c per 100 pounds higher. Cookson's antimony 28½c; other grades 26½c.

NEW YORK.

February 26.

Copper.—The past few days have developed scattering inquiries for deliveries as late as July, while for March and April shipment there is moderate activity. Improved inquiry is noted abroad, but locally the situation manifests little change. Quotations are as follows: Lake, spot and early shipment, 25¼c; futures, 25c; electrolytic, spot, 25c; future delivery, 24⅞c. London closed yesterday at £114 10s for best selections. Exports from Atlantic ports for the

first 24 days of February were 6,991 tons.

Pig Tin.—An advancing British market has brought out further demand for tin in the local market, with a number of sales at 24¼c to 24 1-3c, spot, but cables of a sudden break at London brought about a reaction, with a decline to 24.10c late Monday. For future delivery the level is about the same. Arrivals during the month have totalled slightly less than 2,000 tons, with 3,661 tons afloat. Spot tin closed on the London market Monday at £192 10s.

Pig Lead.—Little change from last week is manifested, the demand being only fair, with 6.25c to 6.30c for spot. Soft Missouri is held at 6.07½c to 6.10c. On the local market, soft Spanish closed yesterday at £19 10s, which is the same as the close a week previous.

Spelter.—The market is quiet, with quotations as follows: Refined, 6.80c to 6.85c in carload lots, spot delivery. St. Louis quotes 6.75c to 6.80c. London closed yesterday at £26.

Antimony.—The demand is very moderate, with quotations as follows: Cookson's spot, 24½c to 25¼c; Hallett's 23½c to 24c; ordinary brands 23c to 23½c.

ST LOUIS.

February 25.

Lead is quotable today at $6.10 for Missouri brands, but the market is quiet.

Spelter is scarce and strong. One hundred tons old today at $6.80.

Owing to the car shortage in the Missouri-Kansas district the shipments of zinc ore for the week were smaller than usual while the shipments of lead ore fell far below the average. In order to make a pretence of shipping buyers frequently had to use open flat cars. The car situation is largely responsible for the decrease of lead ore from $88 to $86.

Plan Elaborate Banquet.—Elaborate preparations are being made for the annual meeting and banquet of the ninth district and the Cleveland branch of the National Metal Trades Association, which will be held at the Colonial hotel, Cleveland, March 14 at 6 P. M. J. H. Webster, of the Variety Iron & Steel Works Co., Cleveland, will act as toastmaster, and responses will be delivered by Robert Wuest, Cincinnati, secretary of the National Metal Trades Association; President J. W. Dawley, of the Cleveland Employers' Association; Howard P. Eells, of the Bucyrus Co., Milwaukee, and Attorney Homer McKeehan, Cleveland.

Fred F. Fischer, of the Fischer Foundry & Machine Co., Pittsburg, whose plant at Ford City was recently damaged by fire, states the loss was not total.

STEEL TIES REMOVED.

An Associated Press dispatch from Philadelphia says:

"General Manager Atterbury of the Pennsylvania Railroad Co., has ordered the removal of all steel cross ties now in use on the line of the Pensylvania railroad. This order is the result of the recommendation of the special committee appointed by the general manager to investigate the wreck near Mineral Point on Friday night when many persons were injured. The committeee says:

"'We are unable to definitely account for the cause of the accident, but the best reason for it that we can advance is, that some foreign material became wedged between the flange of the left rear tender truck wheel and the inside rail.

"'We are of the opinion that the damage was more serious than would have been the case with wooden ties.'"

Transfer Effected.—The transfer of all the properties of the Cherry Valley Iron Co., including the Fannie furnace at West Middlesex, Mercer Co., Pa., and Cherry Valley Furnace, at Leetonia, O., iron ore, coal and lime stone properties and their appertainances, to the United Iron & Steel Co., a deal involving about $7,000,000, was effected Feb. 1. It is announced that no very material changes will be made in the properties for some time to come and that plans for the erection of steel mills to consume the output of the two furnaces have not been figured upon, although this will come later. The officials of the United Iron & Steel Co. are E. N. Ohl, president; W. H. Schoen, vice president and secretary; A. W. Thompson, formerly president of the Republic Iron & Steel Co., treasurer. The offices of the company will remain in the Peoples Bank Building, Pittsburg.

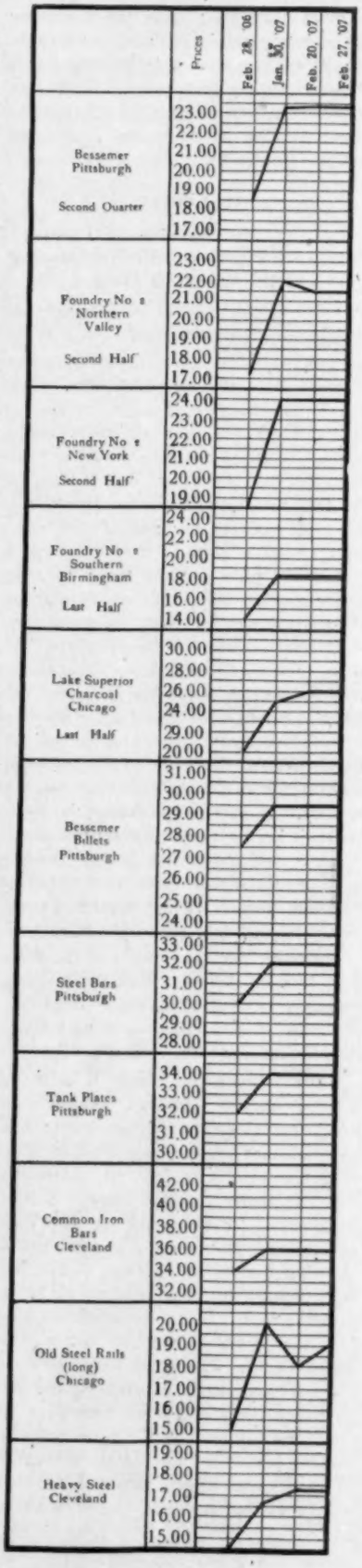
RAIL SALES FEW.

(Special Telegram.)

New York, Feb. 27.—Rail sales have been few during the past week. Scattered lots booked by the leading interest total about 8,000 tons. The reported sale of 50,000 tons to Japanese interests can not be confirmed.

Clinton S. Marshall, district manager of all the plants of the American Steel & Wire Co. of Worcester, speaks glowingly of the great increase in export business of the company during the past year, and stating there has been an increase in export trade of all iron and steel made goods of 75 per cent during the past three years.

PRICE CHART.


Prices
Feb. 28, '06
Jan. 30, '07
Feb. 20, '07
Feb. 27, '07
Bessemer Pittsburgh Second Quarter
23.00 22.00 21.00 20.00 19.00 18.00 17.00
Foundry No 2 Northern Valley Second Half
23.00 22.00 21.00 20.00 19.00 18.00 17.00
Foundry No 2 New York Second Half
24.00 23.00 22.00 21.00 20.00 19.00
Foundry No 2 Southern Birmingham Last Half
24.00 22.00 20.00 18.00 16.00 14.00
Lake Superior Charcoal Chicago Last Half
30.00 28.00 26.00 24.00 29.00 20.00
Bessemer Billets Pittsburgh
31.00 30.00 29.00 28.00 27.00 26.00 25.00 24.00
Steel Bars Pittsburgh
33.00 32.00 31.00 30.00 29.00 28.00
Tank Plates Pittsburgh
34.00 33.00 32.00 31.00 30.00
Common Iron Bars Cleveland
42.00 40.00 38.00 36.00 34.00 32.00
Old Steel Rails (long) Chicago
20.00 19.00 18.00 17.00 16.00 15.00
Heavy Steel Cleveland
19.00 18.00 17.00 16.00 15.00

UNUSUAL CONDITIONS

In Chicago Machinery Market.—New Buildings to be Erected.

Office of THE IRON TRADE REVIEW.
1362 Monadnock Block, Feb. 25.

Much comment has been caused among the machinery men in the past week by the unusual trade conditions during the first month and a half of this year. The trade during January did not show the expected falling off and the receipts and orders for the months were unusually heavy. The holding of the annual directors' meetings, which are ordinarily the cause for the slump in the first month, did not produce the customary effect. On the other hand, their effect has not been felt in increased orders this month. All the machinery men comment on the small number of inquiries and orders which can be traced directly to the annual meetings of the company. The only explanation which has been advanced is that much machinery which ordinarily would not be ordered until approved by the directors was ordered as emergency matter on executive responsibility.

The demand for machinery continues to run chiefly to odd pieces. Few complete shop equipments are being ordered. This is accounted for probably by the shops, realizing the impossibility of obtaining large orders. No signs of the manufacturers catching up with the market are apparent, although one large firm announced this week that it is prepared to ship in general lines from 30 to 45 days after order.

Interest is being shown in the forthcoming tool list of the Big Four railroad. Little information is obtainable concerning the tools to be asked for and the dealers have no idea whether the list will be large or small.

All manufacturers complain of the difficulty in obtaining material. The market for second-hand machinery continues good. In woodworking machinery the manufacturers are slowly dropping behind the orders and one dealer predicts a famine.

Greater precautions to protect the lives of men working in steel construction were demanded by the coroner's jury investigating the death of two men killed in the plant of the Kenwood Bridge Co., Chicago. Four girders fell and crushed the men beneath.

The Troy Laundry Machinery Co. closed a deal last week by which the capacity of its plant at Twenty-third and LaSalle streets will be doubled. Plans for the building are already drawn and work will begin within two weeks. The deal is the result of the determination of the directors of the company to centralize the manufacturing of the firm in Chicago. Less than two years ago the company moved into its present five-story building on the northeast corner of Twenty-third and LaSalle street under a lease of 20 years. The quarters at that time were thought sufficient for years to come. The increase in the machinery trade in Chicago has necessitated the doubling of the plant. The ground obtained by the company is north of the present lot and fronts 250 feet on LaSalle street and runs back 122 feet. The present building fronts 264 feet on LaSalle street and 122 feet on Twenty-third street. The new building will be a counterpart of the present structure. H. S. Wilcox, treasurer of the company, announced that the specifications for the machinery equipment of the building have not yet been completed.

Announcement is made that the H. A. Stocker Machinery Co. has leased the stores and basement of a new building to be erected by Franklin Edgecomb at the southwest corner of Clinton street and Washington boulevard. The new quarters of the company will be only a short half block on the other side of the street from the present salesroom at 20-22 Clinton street. The transaction is another straw which indicates that the machinery district in the course of the changes caused by the erection of the new depot will not move far from its present location. The lease is for ten years and nine months and the building is to be ready for occupancy Aug. 1, 1907. The total rental will be $59,125. The building to be erected at the corner is a large one and other quarters in it will probably be occupied by firms which will be compelled to move.

Road Wants Machinery.

The Grand Trunk railway system has issued a long list of machinery wanted for its new shops at Battle Creek, Mich. Bids are to be sent to A. Butze, general purchasing agent, at his office, Montreal, Can., by March 9, 1907.

The list includes ten improved double-type blacksmith forges; eight 20 horsepower induction motors; four dry grinders, motor driven, motor included; two each of single spring fitting furnaces, outside dimensions six feet six inches by seven feet two inches for fuel oil; 14 inch, stud lathe, belt driven; power back saws, belt driven; two-spindle revolving centering machine, belt driven; two-spindle independent drill press, belt driven; 15-inch turret lathe plain turret slide and saddle, belt driven; 14-inch bolt lathe, belt driven and one each of the following: Extension gap lathe, 36 inches and 60 inches by 15 feet. To be arranged for individual variable speed motor drive, without motor; 90-inch driving wheel lathe to be arranged for individual variable speed, motor drive, capacity guaranteed to turn out ten pair a day, without motor; 14-inch patent head engine lathe, 54 inches between centers, with taper attachment, to be belt driven; 16-inch patent head lathe, distance between centers 49 inches, belt driven; 32-inch patent head engine lathe, belt driven; 14-inch lathe, distance between centers 72 inches, with regular equipment, belt driven; 24-inch patent head lathe 66 inches between centers, belt driven; 18-inch patent head lathe, distance between centers, 69 inches, belt driven; turret lathe, two inches by 24 inches, with locomotive equipment, belt driven; automatic turret lathe, full locomotive equipment belt driven; 15-inch turret lathe, chasing equipment, belt driven; planer, 16 inches by 16 inches by 42 inches, belt driven; draw cut planer, 48 inches by 48 inches by 72 inches, with full locomotive equipment, motor included; 24-inch drill slotter, individual motor drive, without motor; 24-inch double-head traverse shaper, individual motor drive, without motor; 32-inch draw cut shaper, individual motor drive, without motor; 15-inch by 36-inch traverse shaper, belt driven; 86-inch boring mill, individual motor drive, without motor; 51-inch boring mill, individual motor drive, without motor; 42-inch car wheel borer, individual motor drive, without motor; 30-inch boring mill, belt driven; horizontal milling machine, 36 inches by 36 inches by 144, individual motor drive, without motor; plain milling machine, individual motor drive, without motor; universal milling machine with slotting attachment, individual motor drive, without motor; 36-inch plain radial drill, belt driven; 28-inch high-speed drill, belt driven; 21-inch drill press, belt driven; six-spindle turret head drill, belt driven; 14-inch sensitive two-spindle drill press, belt driven; two-spindle valve milling machine, belt driven; cock grinder, complete with counter shaft, belt driven; 24-inch high speed drill press, belt driven; 400 ton hydraulic wheel press, inclined type, individual motor drive, without motor; 150-ton hydraulic wheel press, individual motor drive, without motor; 50-ton vertical forcing press, with hydraulic gage, belt driven; 30-ton power forcing press, with hydraulic gage, belt driven; 20-ton power forcing press, with hydraulic gage, belt driven; 100-inch wheel quartering machine, motor driven, motor included; four-spindle 2-inch nut tapper, belt driven; two-inch triple bolt cutter, belt driven; two-inch nut facer, belt driven; dry grinder, individual motor drive, without motor; 72-inch guide bar grinder, belt driven; 18-inch by 30 gap grinding machine, motor driven; disc grinder, belt driven; wet drill grinder, belt driven; universal cutter and tool grinder, with equipment, belt driven; cock grinder, with counter shaft, belt driven; portable valve seat rotary planing machine, size 26 inches; 25-foot plate planer, motor driven, motor included; horizontal punching machine, capable of punching, 1½-inch hole in 1¼-inch plate, depth of throat 61 inches, motor driven, motor included; rapid action punch and riveter 60-inch gap, motor driven, motor included; rotary plate splitting machine, capacity ¾-inch plate, motor driven, motor included; rotary beveling shears, capacity up to ¾-inch plate, motor driven, motor included; set of vertical plate bending rolls, 12 feet between housings, motor driven, motor included; universal hydraulic flanging press, capacity seven-inch flange on one-inch plate; submerged type of flue rattler, capacity 300, two-inch flues, 16 feet long, motor driven, motor included; adjustable wall radial drill, 20-foot arm, equipped, motor driven, motor included; six-spindle stay bolt threader, with center turning attachment capacity, 1½-inch by 25-inch staybolt, motor driven, motor included; four-spindle stay bolt drill, capacity to drill 5-16-inch holes three inches deep in stay bolts ¾-inch to 1½ inches by 15 inches long; furnace, annealing, size 8 feet 10 inches by 13 feet, 11 inches; single-type improved blacksmith forge, double-type improved blacksmith forge; 3,000-pound single frame steam hammer, 42-inch stroke, die surface, ten inches by 16 inches; 3,500-pound double frame steam hammer, 45-inch stroke, die surface, eight inches by 18 inches; 5,000-pound double frame steam hammer, 48-inch stroke, die surface, 11 inches by 24 inches; punch and shears, 18-inch throat, motor included; 1½-inch upsetting, heading and forging machine, motor driven, motor included; combined nibbing and trimming machine for heavy locomotive springs, motor driven, motor included; bulldozer, 15 feet 15 inches by six feet nine inches, bend 12-inch by two-inch iron, motor driven; improved single-type blacksmith forge; 14-inch by 20-inch sizer and planer, belt driven; three-spindle vertical boring machine, table eight feet 11 inches long, belt driven; universal saw bench, with double revolving arbor and two 16-inch saws, belt driven; 36-inch band saw with iron table and ball bearing guide and one blade, belt driven; 30-inch buzz planer, seven-foot table, belt driven; 30-inch automatic knife grinder, with emery wheel 26 inches diameter, 1¼-inch face, also water pump and settling tank, belt driven; improved heavy automatic cutting-off machine, belt driven; quadruple car box boring machine, capacity 5½ inch by 10 inch journal brasses, motor driven, motor included; double chamber, rotary furnaces, complete with ladle heaters for fuel oil; separator, capacity 200 to 500 pounds metal per hour, motor driven, motor included; compressor; 56-inch by 42-inch by 32 feet frame planer, motor driven, motor included; compound cylinder boring machine, motor driven, motor included; 60-inch by 48-inch by 12-foot planer, motor driven, motor included; plain miller, motor driven, motor included; 18-inch slotter, motor driven, motor included; 16-inch pillar shaper, belt driven; 16-inch engine lathe, belt driven; 16-inch pillar shaper, belt driven; 12-inch cutting off and centering machine, motor driven, motor included; five-inch forging machine, motor driven, motor included; locomotive rod borer; ten horsepower induction motor; 30 horsepower induction motor and 40 horsepower induction motor.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

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THE GEOGRAPHICAL TREND OF IRON PRODUCTION.

The drift of pig iron producing centers can be gaged by data showing percentage contributions better than by any other means. Following our custom in recent years, we present a table showing the precentage of the country's total made by each producing district, for a number of years. As the production of the country at large has increased very rapidly, comparisons by tonnage are not conclusive. If a given district merely doubled its production from 1890 to 1906, it would show a decreased proportion of the total, as the total increased by more than 150 per cent in that time.

Maine has disappeared entirely as a producer, but made only a thousand tons in 1890. The Upper Susquehanna valley has disappeared, largely by reason of the removal of the Lackawanna interest. In 1890 it produced 185,000 tons. The Hocking valley, in Ohio, had 15 stacks in 1890, but they made only 80,000 tons; now but one furnace is in operation and its production is included with the lake counties. Fifteen years ago, some charcoal pig iron was produced in Pennsylvania, but the tonnage has become inconsequential.

So much for demised districts. The districts which have grown, since 1890, in point of percentage, have all been more or less tributary to Lake Superior ores. Pennsylvania's contribution as a state has decreased, but Allegheny county has grown largely, from making 14.5 per cent of the country's total in 1890 to 23.5 per cent in 1905 and 22.6 per cent in 1906. The Shenango valley and the scattered western Pennsylvania district have also grown. Ohio has shown a large increase.

The Great Northern-Steel Corporation ore deal established a situation regarding Lake Superior ores to which the minor developments had been trending—that situation making it practically imperative that any important new erection of blast furnaces by new interests, not already provided with ore, must be based upon other fields. It is impossible to find any clear tendency of this sort worked out into actual production as yet. Comparing 1906 with 1905 it can be seen by the table that the Schuylkill valley, New Jersey, Maryland, North Carolina, Georgia and Texas, Kentucky and Tennessee, all districts not directly tributary to Lake Superior ores, increased their percentage contribution slightly. This is a move which may, ultimately, be expected to become more general, but probably not for several years. The outside districts may increase their tonnage, but with the large increase still going on in the consumption of Lake Superior ores, their percentages cannot readily increase.

Comparing 1906 with 1905 in districts directly tributary to the Lake Superior region, it is observed that New York, the lake counties of Ohio, the Mahoning valley, the miscellaneous furnaces in Ohio, and Michigan furnaces, increased their percentage contribution. As the country at large increased production by a trifle over 10 per cent, these districts did very well in the point of tonnage.

Allegheny county fell behind, for the time being, making 23.5 per cent of the country's total in 1905, and only 22.6 per cent in 1906. The tonnage, however, showed an increase of nearly 300,000 tons, or between 5 and 6 per cent. During the past two calendar years, but one absolutely new furnace has been completed in Allegheny county, while there are three new stacks to be blown in during the first half of this year—one McKeesport and two Carrie—and two Duquesne to come not long afterward. These furnaces will make the percentage of Allegheny county higher than ever.

There is another means of gaging the trend of pig iron production, and while it is not so precise as the comparison of percentages of actual production, it looks a year or so farther ahead. That method is the examination of furnaces completed or being built. The follow-

Proportionate Pig Iron Production in United States by Districts in Per Cent.

	1890	1900	1902	1903	1904	1905	1906
Massachusetts and Connecticut	0.3	0.1	0.1	0.1	0.1	0.1	0.1
New York	3.6	2.1	2.3	3.1	3.6	5.2	6.1
New Jersey	1.7	1.2	1.1	1.2	1.6	1.4	1.5
Pennsylvania	(48.0)	(46.2)	(45.5)	(45.6)	(46.3)	(46.0)	(44.4)
Lehigh Valley	7.9	4.0	2.9	3.6	2.8	2.7	2.5
Schuylkill Valley	5.9	3.2	2.9	3.1	2.5	2.4	2.8
Upper Susquehanna Valley	2.0	1.0	0.0	...	...	...	...
Lower Susquehanna Valley	5.5	3.9	3.0	2.8	2.4	2.9	2.6
Juniata Valley	2.1	0.9	1.1	1.3	0.7	0.9	0.8
Shenango Valley	6.5	5.8	7.0	6.3	6.1	7.8	7.7
Allegheny County	14.5	22.6	23.9	23.4	26.6	23.5	22.6
Miscellaneous	3.6	4.7	4.7	5.1	5.2	5.8	5.4
Maryland	1.6	2.1	1.7	1.8	1.8	1.4	1.5
Virginia	3.2	3.6	3.0	3.0	1.9	2.2	1.9
No. Carolina, Georgia and Texas	0.4	0.3	0.2	0.5	0.5	0.2	0.4
Alabama	8.9	8.6	8.3	8.7	8.8	7.0	6.6
West Virginia	1.4	1.2	1.0	1.1	1.6	1.3	1.2
Kentucky	0.5	0.5	0.6	0.6	0.2	0.3	0.5
Tennessee	2.9	2.6	2.2	2.3	1.8	1.6	1.7
Ohio	(13.5)	(17.9)	(20.4)	(18.2)	(18.1)	(19.9)	(21.0)
Mahoning Valley	3.4	7.3	8.1	7.0	7.4	7.5	7.7
Hocking Valley	0.9	0.4	0.2	0.1	0.1	*	*
Lake Counties	...	3.6	4.8	4.6	4.9	5.7	5.8
Miscellaneous Bituminous	6.0	4.8	5.4	4.6	4.2	5.2	5.4
Hanging Rock Bituminous	1.0	1.8	1.8	1.8	1.5	1.5	1.6
Hanging Rock Charcoal	0.3	0.1	0.1	0.1	...	0.0	0.0
Illinois	7.6	9.9	9.7	9.4	10.0	8.8	8.5
Michigan	2.5	1.2	0.9	1.3	1.4	1.3	1.5
Wisconsin and Minnesota	2.4	1.3	1.5	1.6	1.3	1.5	1.5
Mo., Colo., Ore. and Wash.	1.3	1.1	1.5	1.5	1.0	1.8	1.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTES:—Where the percentage is given at 0.0 it indicates merely that the production was less than one-twentieth of 1 per cent; ... indicates no production at all. *Production of the single furnace included with Lake Counties. Maine produced less than one-twentieth of 1 per cent in 1890, and in the following years named produced nothing. Pennsylvania produced 0.2 per cent of charcoal pig in 1890, and in the following years named produced a tonnage less than one-twentieth of 1 per cent. Indiana produced 0.2 per cent in 1890, but in the following years named produced no tonnage. The totals of Pennsylvania and Ohio are included in parentheses because these percentages are duplicated in the details by districts in these two states.

ing summary shows all the blast furnaces blown in since Jan. 1, 1905, or on which construction is now in progress.

There were blown in during 1905: 10 absolutely new furnaces; one charcoal in Michigan, two coke in Alabama, one merchant furnace in New York, and six regular steel works furnaces, tributary to Lake Superior.

There were blown in during 1906: 11 absolutely new furnaces; one Michigan charcoal stack; four merchant stacks, at Troy, N. Y., in Tennessee, in eastern Pennsylvania (spiegel), and in western Pennsylvania; six regular steel works furnaces, all tributary to Lake Superior except that one Cambria stack is not absolutely so.

There have been blown in thus far in 1907, or are quite well under way, 22 furnaces, of which one is a southern merchant stack, five are northern merchant stacks, tributary to Lake Superior (one in Wisconsin), and the remaining 16 are regular steel works furnaces, tributary to Lake Superior. Of these 16 there are seven in western Pennsylvania, these being two Carrie, two Duquesne, one McKeesport and two Aliquippa; three at Youngstown, these being one Haselton and two Ohio; one New York, Lackawanna; one Colorado, and four Indiana, at Gary. It would not be far wrong, however, to give Gary and Aliquippa credit for double these numbers.

It is obvious from this presentation that the active furnace building is based almost exclusively on Lake Superior ores; two years hence the percentage of the country's total pig iron, made from Lake Superior ores, will necessarily be greater than it was in 1906 or 1905. In the more distant future the showing may be quite different, but the swing in that direction cannot come until there is another great era of furnace building, if it comes then. With the large number of furnaces now being built that later era is not likely to be for some time.

RAILROADS AND THE PUBLIC.

The late Samuel Spencer was one of the country's great railroad men, and to succeed him and give satisfaction to all concerned was indeed difficult. If, however, we may judge from his recent addresses, W. W. Finley, the new president of the Southern Railway, will soon stand as high in the estimation of the public as did his distinguished predecessor. Mr. Finley has recently delivered a number of addresses on the relations of the public to the railroads, and seems to be entirely willing to take the patrons of the road into his confidence and conform to their wishes as far as it is possible for him to do so. He appreciates that in no business has courtesy a greater commercial value than in that of the railroads, and in an address to representatives of the freight and passenger departments of the railroad, a few days ago, he dwelt upon the fact that he who serves the railway best serves the public best. "All classes of the public," said Mr. Finley, "should be treated with consideration and be given every possible and reasonable accommodation. Even the man who makes impossible or unreasonable demands should not be dismissed with a curt refusal." In these days, when the railroads are looking as they never did before for public favor, the courtesies extended by employes have a most important bearing upon the relations of the people to the great transportation interests, and Mr. Finley's words are indeed opportune.

Mr. Finley also emphasizes the importance of observing the laws. "No transaction or practice," he declares, "that is forbidden by the laws can be permitted, and there must be no resort to evasion of any kind." Statements like these, followed by strict adherence to the high principles enunciated will bring about most gratifying results, tending to soften the harsh feelings of the public and to check the disposition now noticeable to go too far in denunciation of the railroads.

Cast iron foundries in the Birmingham district are working over time to get out the product on orders booked some time ago and recently. The Birmingham district is furnishing a large quantity of pipe for the Jamestown exposition. New Orleans and some eastern cities recently placed some handsome orders for cast iron pipe in this section and all indications point to a liberal trade for many months to come. In fact, the opinion is expressed that the cast iron plants are going to be kept busy through the year. There is a large quantity of pipe already manufactured on the yards at the various plants in this section.

FAVORABLE OUTLOOK

Reported for Formation of National Association of Shippers.

The movement to organize a national association of shippers, at a convention called at Richmond, Va., March 7, with the object of gaining a quicker movement of freight, is progressing favorably, reports T. Peyton Giles, of the Stephen Putney Shoe Co., Richmond, Va., one of the promoters. Mr. Giles stated that already encouraging responses from many directions and covering many important lines of business have been received from associations and firms invited to attend the conference.

The proposed conference, it is stated, is to be a business-like interchange of ideas, with a view of forming a large, compact, thoroughly organized and permanent association, and to provide a financial plan to make this organization effective. The entire effort of the association will be devoted to a systematic plan to extend its membership throughout the United States and to perfect its organization. When this is done the association will then be in a position to command the attention of congress, the administration and the country at large to any reasonable measure of relief it may ask. It is stated that the association will only ask for such time limit on movement and reciprocal car service rules on interstate freight as would be practicable and equitable, allowing the railroads sufficient time to prepare themselves to carry out the proposed ruling when issued by the proper authorities.

Mr. Giles, in behalf of several hundred business associations and many firms and corporations, has addressed an open letter to President W. W. Finley, of the Southern railway, asking for information about the road's equipment, the management's opinion as to a reasonable and equitable number of miles per hour for interstate freight, the company's opinion of the present demurrage rules and the proposed reciprocal demurrage rules and other questions bearing upon the traffic situation.

May Refuse to Buy.—Of interest in connection with the campaign now being widely waged against the great mail order houses of the country is the decision recently handed down by Judge Carland, of the United States District Court at Sioux Falls, S. D., refusing to enjoin the South Dakota General Merchants' Association from campaigning among its members against trading with the catalog concerns. By the decision dealers are specifically given the right to refuse to deal with manufacturers or jobbers who sell the catalog houses.

DEATH OF WM. C. McMILLAN.

William C. McMillan, financier, manufacturer and one of Detroit's most prominent and influential citizens, died at his home in that city Feb. 21, following two months of serious illness from pneumonia and congestion of the lungs, which was complicated by an affection of the heart. Three crises were encountered in the course of Mr. McMillan's illness, but his wonderful physical endurance and vitality enabled him to surmount two of these relapses. The third and fatal attack was accompanied by a weakness of the heart and the inevitable followed. In the death of Mr. McMillan the city of Detroit loses one of its most substantial citizens, and the industrial world a prominent figure. In the iron and steel manufacturing line he was a well-known personage. At the time of his death he was president of the Michigan Malleable Iron Co., the Detroit Seamless Steel Tube Co., the Monarch Steel Castings Co., and the Detroit Shipbuilding Co.; secretary of the Detroit Iron Furnace Co., and director of the American Shipbuilding Co. the Detroit & Buffalo Steam Boat Co.; vice president of the Duluth & Atlantic Transportation Co., director of the Michigan Steamship Co., and the Wolverine Steamship Co. His other lines of industrial effort included telephone companies, trust companies, banks, hotels, railroads, etc. Mr. McMillan was the eldest son of the late Senator McMillan, and was born in Detroit, March 1, 1861. After securing his education in the Detroit public schools and Yale University, he entered the employ of the Michigan Car Co., and in three years he had displayed such executive ability that he became general manager of the plant. He continued in this capacity until the Michigan Car Co. was consolidated with the Peninsular Car Co. in 1892, then as managing director of the Michigan-Peninsular Car Co. until it was absorbed by the American Car & Foundry Co. In 1898 Mr. McMillan and his father bought the controlling interest of the Michigan Malleable Iron Co., and he was made its president. Under his control the concern has been very largely extended. Later Mr. McMillan organized and secured the controlling interest in the Detroit Seamless Steel Tube Co. Four years ago he was suggested as a successor to his father in the United States senate, but declined to make the race. He was a candidate for this high office before the legislators of his state this year, but, handicapped by his illness, he was defeated. In politics Mr. McMillan was a dominant figure, and one of the leaders of his party in Michigan. The funeral services were held Feb. 23 from the family residence and the interment was made in the family vault at Elmwood cemetery.

WILLIAM C. McMILLAN.

OBITUARIES.

James McGregor died Feb. 20 at his home in Loyalhanna, Pa., at the age of 53. He was superintendent of the Loyalhanna Coal & Coke Co.

John M. Ryan, aged 43, died recently at his home in McKees Rocks, Pa. He organized and managed the Fort Pitt Malleable Iron Works, McKees Rocks.

John R. Eakin, president of the Olive Stove Works, Beaver, Pa., died in that city Feb. 18, of paralysis, aged 78. Mr. Eakin was the first man to develop the coal industry at Enon, and for several years operated large mines there. He is survived by his wife and three children.

Evan Evans, president and general manager of the Evans Mfg. Co., Butler, Pa., died Feb. 11, at the age of 51. For 15 years he was a manufacturer of oil well supplies and gas engines, and was inventor of many useful devices.

George L. McGregor, proprietor of the George L. McGregor Boiler Works, 246 South Canal Street, Chicago, died Friday, Feb. 8, after an illness which lasted five years. Deceased was one of the oldest boiler manufacturers in the west.

John W. Bryan, identified with the early stages of the Bessemer steel business at Johnstown, Pa., and for six years superintendent of the Oliver Iron & Steel Co.'s plant at Pittsburg, died recently at Ashland, Ky., from paralysis. After ceasing his connection with the plants in the vicinity of Pittsburg, he went to Ashland, and for twelve years was superintendent of the Ashland Steel Co.

CURTAILMENT BEGUN

BY THE RAILROADS SAYS PRESIDENT JAMES HILL.

Great Northern Head Discusses Traffic Situation.—Reciprocal Bill Passes.—In the Railroad World.

"The railroad facilities of the country have been paralyzed by the growth of business," President James J. Hill of the Great Northern railroad is quoted as saying. "Not alone more cars, but more tracks and more terminals—these are what are needed," says Mr. Hill. "A recession has set in, although it is not much at present. The railroads generally are curtailing expenditures, and sails are being reefed. This is one phase of the situation that will be a big help.

"Some of the producers in the United States must suffer. If we get bumper crops again, they will be likely to suffer still more. The trouble will be that their products cannot be moved by the railroads. It has been suggested that it would be a good thing to pool all the cars. But the good that could come from such a thing as this is purely an illusion. After all, it is not a lack of cars; it is much more than that. You must not only have cars, but you must have capacious terminals to move them to, and you must have the tracks to move them over. That is the only thing about it, and it is the situation in a nutshell.

"Now, for instance, there is plenty of corn in Kansas today. There are people in the east who would like to have it. The railroad man finds that when he hauls it, his cars will be tied up three months. Chicago asks for seven days in which to reconsign freight. Think of holding up a train of cars for seven days merely for a consignment. A shipload of grain is moved through the lakes to Buffalo. There it is held up 14 days, not because of lack of labor to unload, but because the elevators are full and there are no cars to move the grain. This happens right along."

Regarding the cry about the over-capitalization of railroads, Mr. Hill refused to talk except on the subject of the Great Northern, which he said had nothing to fear in this respect.

Reciprocal Bill Passes.

The reciprocal demurrage bill introduced in the Minnesota legislature has passed the house of representatives of that state by a final vote of 133 to 1. The amendments adopted fix the date when the bill shall take effect as July 1, and give the railroad company a right to unload shipments at the expense of the receiver, when unloading is delayed beyond the prescribed time. Alarmed at the possible enactment of the bill, over 200 Minneapolis shippers and prominent business men have signed a petition addressed to the senate protesting against the radical measures of the bill. Aside from expressing themselves as opposed to the bill on the ground of it being unjust to the railroad companies, while on the surface it favors the shippers, the latter are alarmed lest the legislation proposed may result in wholesale rebate abuses, which would effectually quench competition and cause a slaughter of small dealers.

Indicted for Rebating.

The Great Northern Railway Co. was indicted by the federal jury in New York Feb. 19 on the charge that in 1904 it paid $10,000 in rebates on sugar shipments to Lowell M. Palmer, traffic agent of the American Sugar Refining Co. The second count of the same indictment charges that $4,554 additional rebates were paid to Mr. Palmer by various railroads in conjunction with the Great Northern. The indictment charges that the Great Northern Railway Co. effected freight combinations with the Lehigh Valley, the New York Central and the New York, New Haven & Hartford railroads, and the Great Northern Steamship Co., whereby sugar was transported from New York City and Boston to Sioux City, Ia., by an agreement with the company, at less than the published tariff rates.

Railroad Notes.

The Colorado & Southern railroad has sold $1,026,000 in 5 per cent bonds in order to finance the greater part of new equipment ordered, consisting of 54 locomotives, 1,085 freight cars and 14 cabooses. The freight cars are principally steel ore cars and stock cars.

The Metropolitan West Side Elevated Railroad Co., Chicago, has placed an order with the Pullman Co. for 20 new motor cars.

The Denver & Rio Grand railroad is taking legal proceedings at Pueblo, Colo., to secure land upon which to erect machine, engine, car shops and other buildings.

Plans are being drawn by the engineers of the Pennsylvania Railroad Co. for the erection of machine shops in the yards at Enola, Pa.

The Ann Arbor Railroad Co. has paid the United States court at Toleda $15,000 fine imposed upon it for violation of the interstate commerce laws in granting rebates to the Toledo Ice & Coal Co.

The Nickel Plate railroad is planning to spend $1,000,000 for passenger equipment. Orders have been placed for six engines, six baggage cars, six coaches and two cafe parlor cars. The engines will be of the most modern type and will be built for speed. Delivery will be made about June 1.

SHEA ACQUITTED

At Second Trial for Conspiracy in Chicago.—Other Labor News.

Cornelius P. Shea, president of the International Brotherhood of Teamsters, and his 10 fellow defendants, who were charged with conspiracy during the teamsters' strike against the department stores in Chicago two years ago, were acquitted at the second trial in that city Feb. 21. At the first trial, after a long, drawn-out hearing, the jury disagreed. The second trial was completed in much less time than the first, and the jury returned the verdict after being out four hours.

Labor Notes.

The Punxsutawney Iron Co., Punxsutawney, Pa., has granted a voluntary increase in wages of 10 to 15 per cent.

A general strike of boilermakers, helpers, blacksmiths and blacksmith helpers has been declared against the Missouri Pacific & Iron Mountain railway system on the refusal of the management to grant a three cent per hour increase. The company was willing to concede a two cent increase.

The strike of molders and coremakers, which started in the plant of the Canadian Iron & Foundry Co., Hamilton, Ont., Aug. 29, has been called off unconditionally, says the National Founders' Association. The members of the local union acknowledged to the firm that the strike was a grievous mistake on the part of the union men.

District No. 15 of the International Association of Machinists, which includes Greater New York, Jersey City and Hoboken, has decided by a referendum vote to make a general demand for the eight-hour work day. In this district there are about 15,000 machinists and it is stated that the New Jersey branch of the association will probably follow the same course. The demand is to be made shortly.

Shows Increase.—An increase in business of 50 per cent over 1905 was shown by the annual report of the Interstate Engineering Co., Cleveland, which has been submitted to stockholders. The stockholders voted to apply the net earnings of the year to the increase of the company's plant at Bedford. The regular quarterly dividend was declared on preferred stock, and directors were elected as follows: E. J. Kaltenbach of New York, president; R. W. Kaltenbach, Cleveland, vice president; Albert Capelle, Cleveland, secretary; Justin Griess Jr., Cleveland, treasurer; Charles A. Klump, Cleveland, chairman of the board. Paul Schneider of Bedford, and Earnest Griess of Cincinnati, are also included in the directory.

PERSONALS.

Alex K. Hamilton has been appointed to succeed George L. Reis as general manager of the steel works of Milliken Bros., Inc., New York.

George W. Bragg has been made superintendent succeeding H. T. DeBardeleben of the Bon Air Coal & Iron Co.'s furnaces and ore mines at Allens Creek, Tenn.

H. R. Southworth, formerly circulation manager of the *Binghamton Press*, Binghamton, N. Y., has become manager of the publicity department for the General Fireproofing Co., Youngstown, O.

Charles S. Knight Jr., assistant sales manager of the American Steel & Wire Co., Chicago, and W. O. Duntley, of the Chicago Pneumatic Tool Co., were among those injured in the wreck of the Pennsylvania flyer at Black Diamond, Pa., February 22. Their injuries, however, are not dangerous.

Congressman John E. Reyburn, senior member of the firm of Reyburn, Hunter & Co., manufacturers of lightning rods, was elected mayor of Philadelphia on the Republican ticket, Feb. 19, over William Potter, the Democratic-City party candidate. Congressman Reyburn's plurality was 33,003.

Wm. Coghlin, for the past nine years prominently identified with the National Supply Co., Toledo, O., has severed his connection with that company and entered the employ of the Patterson Tool & Supply Co., of Dayton, O., for whom he will travel in Ohio.

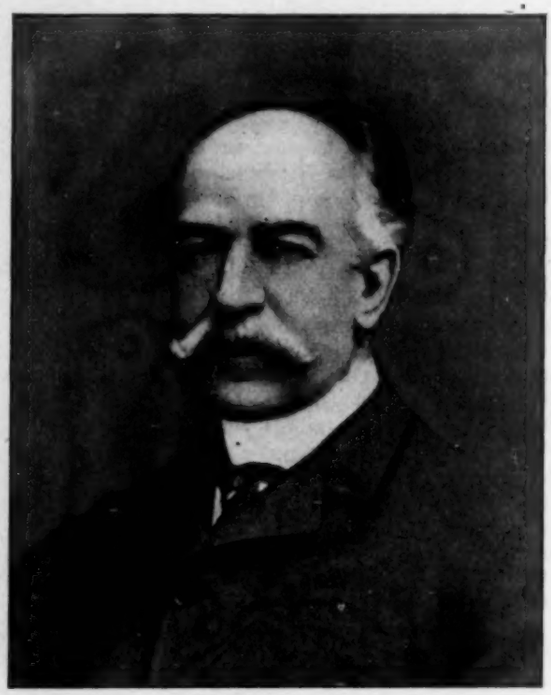
Thomas McDonald, general superintendent of the Youngstown district of the Carnegie Steel Co., and a party, including district heads of the United States Steel Corporation, are now homeward bound after a European trip. The party on its trip studied and investigated the manufacture of steel in Germany, England and France, as well as coke-making and other similar operations.

Arthur H. Allen, formerly a member of the contracting firm of H. B. Cummings & Co., of Boston, and more recently in business for himself, is now a part of the organization of Frank B. Gilbreth, contractor, of New York. Mr. Allen, with the larger part of his own organization, has left Boston for San Francisco, where he will join Mr. Gilbreth's western office.

Harry Scullen, president, has also assumed the management of the plant of the Scullen-Gallagher Iron & Steel Co., succeeding J. M. Maher, whose resignation becomes effective March 1. Mr. Maher will take charge of the new steel foundry which will be erected by the Curtis & Co. Mfg. Co. Its melting equipment will consist of two Tropenas converters.

DEATH OF FRANK J. HEARNE.

Frank J. Hearne, president of the Colorado Fuel & Iron Co., former president of the National Tube Co., and one of the present day captains of the iron and steel industry of the United States, died at Denver, Colo., Feb. 25, from an attack of peritonitis and grip. After resigning the headship of the National Tube Co., several years ago, and practically retiring from business, Mr. Hearne was called upon by the Gould interests to go west and take charge of the Colorado Fuel & Iron Co. In this capacity Mr. Hearne became a prominent factor in the development of the western iron and steel industry, until now at his death, he has made his company a power in that rapidly developing section of the country. To his life's last charge Mr. Hearne had carried his business resourcefulness and ability as an organizer which had enabled him to attain a lofty position in the industrial world of the nation. Col. Hearne, as he was best known, was born in Cambridge, Md., Sept. 21, 1846, and he was therefore 60 years of age at his death. After receiving an academic education he entered the Troy Polytechnic Institute from which he graduated in 1867 with the degree of civil engineer. His first position was that of assistant engineer of the Hannibal & St. Joe railroad, which he held until 1872. On the advice of his father, William J. Hearne, he resigned his position in that year to become assistant general manager of the Riverside Iron Works, Wheeling, W. Va. There he began his career in the iron and steel industry, which did not end until he had become one of the pre-eminent figures of the country. When the Riverside property was transferred to the National Tube Co., Col. Hearne accepted the promotion of first vice president of the latter company. This upward step in his life concluded his 27 years of active service with the Riverside works. When the United States Steel Corporation was formed, Col. Hearne was the active head of the National Tube Co., though holding the position of first vice president. E. C. Converse was then president, but when he was named a member of the executive committee of the corporation he went to New York, leaving Col. Hearne at the headquarters in Pittsburg in line for advancement to the highest position in the company. This came to him in 1902, and he resigned in August of that year. His well-earned rest proved but a recess, however, for his recognized ability as an organizer brought to him the insistent demand of the Goulds and resulted in his reappearance in the iron and steel world as the head of the Colorado Fuel & Iron Co. In his private life Col. Hearne was no less highly prized than in his business career. He was possessed of a charming personality and in Pittsburg, where he had spent most of his active life, he was especially held in high esteem. His tastes turned to the beautiful and he was renowned as a student and lover of art. His wife and one son, W. L. Hearne, survive.



FRANK J. HEARNE.

INDORSE PAST POLICY.

The annual meeting of the Warwick Iron & Steel Co., in which there has been friction because of the complaints of some stockholders that the management was too conservative in the matter of dividends, was held in Philadelphia on Feb. 19 and proved a complete victory for President Cook's policy, which was indorsed by an overwhelming majority. Under the cumulative system of voting allowed in Pennsylvania, G. E. Schlegelmilch was elected a director representing the minority, with the following directors of the present management: Edgar S. Cook, William H. Shelmerdine, William S. Pilling, Frederick W. Tunnell, F. H. Bachman, Philip Doerr. At a subsequent meeting of the directors President Cook was re-elected president and Mr. Doerr vice president,

RECENT MODIFICATIONS IN BLAST FURNACES.[1]

IMPROVEMENTS IN CONSTRUCTION TO SAVE LIFE AND PROPERTY.

Development of the Closed Top.—Elimination of Danger from Slips.—Prevention of Waste of Material Charged.

By Julian Kennedy.[2]

Within the last twenty years American blast furnaces have increased greatly in size and output. In the same time there has been a marked change in the raw materials used in them. Owing to the enormous tonnages made, it has become necessary to use in addition to what are known as the old range ores, which are coarse and lumpy, a large proportion of the Mesabi range ores, which are comparatively fine and dusty in structure, and which have a tendency to interfere with the free passage of the blast through the furnace, and to cause the furnace to work irregularly and to hang and slip. This hanging and slipping causes a variable pressure in the bottom of the furnace and also causes great disarrangement of the stock descending in the shaft of the furnace. When a furnace is working normally, the blast pressure drops gradually from the level of the tuyeres up to the zone of fusion, or say six feet, above them, where there is a rapid drop for a short distance and then a gradual drop from this point to the top of the furnace. The blast pressure in a normal working furnace is shown in a general way in Fig. 1.

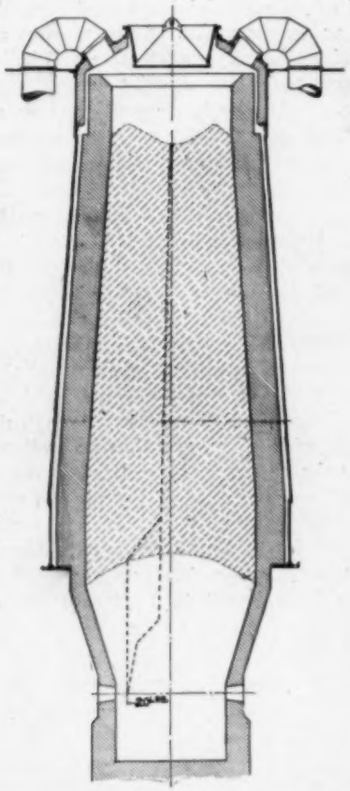


Fig. 1.—Blast Pressure in a Normal Furnace.

When a furnace is hanging, especially if it stops moving for a considerable time, the stock burns out below, leaving a cavity, and anyone who has examined a furnace which is hanging, by taking the blast off and looking through the cinder notch or the tuyere with the aid of a mirror, can see this cavity very readily. In the case of a furnace hanging stubbornly, the cavity will often be formed about as shown in Fig. 1, the interior of the arch looking quite smooth, due to fusion going on at this point.

After the cavity reaches a certain size, a portion of the stock is liable to drop, breaking the arch and causing the stock above to come down with a rush. At the same time the compressed air in the cavity at the bottom of the furnace is released, and goes up through the falling stock with a tremendous rush. If the top of the furnace is constructed as shown in Fig. 2, having its hopper and cone set on the brick work and held almost entirely by its own weight, this rush of gases is liable to lift the entire top up or perhaps throw it entirely off the furnace. It was formerly the practice to set the hopper in a base ring resting on the brick lining alone, but as the lining sometimes disintegrated and allowed the hopper to drop into the furnace, brackets were added to prevent this, as shown in Fig. 2, and later the hopper was bolted down to these brackets or to a frame of beams which took their place. To prevent the upheaval of this bell and hopper apparatus, so-called explosion doors were placed on the downcomers, and in some cases extra openings were carried out through the casings and additional relief doors were fitted to these openings. In the case of heavy slips where heavy pressures and large volumes of blast are used, the upward rush of the blast picks up the ore and coke and carries it up with it and hurls it out of the relief doors in great quantities, it being not unusual to see from 30 to 50 tons of ore, coke and limestone thrown out of a furnace in less than as many seconds at the same time that a vast cloud of gases and ore dust envelopes the top of the furnace, and some times these gases light as they come out, making a tremendous flame.

About seven years ago it occurred to me that, if possible, some method ought to be devised to prevent the terrible loss of life on top of furnaces that was going on, due to men being suffocated or burned on the tops of furnaces, as well as the loss and damage caused by the throwing out of material at the relief doors. After studying the matter for some time, I concluded that there was no good reason why the usual explosion doors should not be omitted. It seemed to me that what was usually spoken of as an explosion following a slip, was not an explosion at all, but that the material thrown out was carried up by the rush of the blast in just the same manner that dust or grain is carried in a pneumatic conveyor. The fact that bells and hoppers were thrown off furnaces by slips appeared to point to very high pressures until I had figured the amount of pressure required to throw up these hoppers, and somewhat to my surprise I was

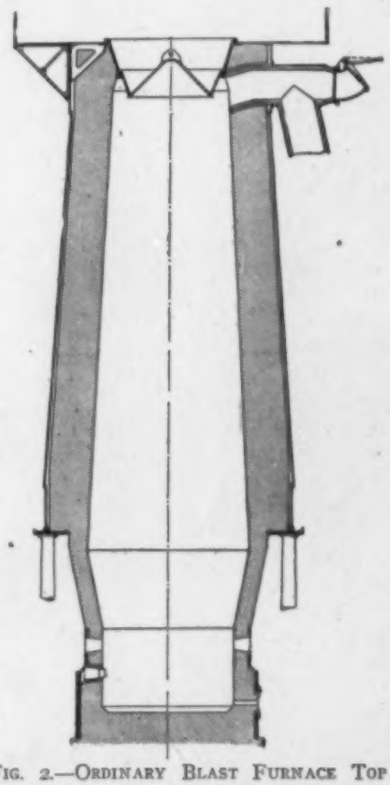


Fig. 2.—Ordinary Blast Furnace Top Construction.

[1]Presidential address to the Engineers' Society of Western Pennsylvania, Jan. 15, 1907.
[2]Consulting engineer, Bessemer Building, Pittsburg, Pa.

not able to find a furnace in the United States whose top would not be lifted by a pressure of two and one-half pounds per square inch. After giving a good deal of thought to the matter, I formed the opinion that the ultimate pressure which could be produced in the top of a furnace following a slip, would be the pressure in the blast main, or in other words, that the pressure in this case comes from the blast engines, and the stream cannot rise higher than its source. It also seemed to me that if the furnace casing were made strong enough to resist this pressure, it would be entirely safe to reduce the size of the outlets to such an extent as to offer a material resistance to the flow of the gases from the furnace in the event of a sudden and heavy rush of blast through the furnace, and that such a choking of the gases at these outlets would greatly diminish the rapidity of flow for the moment, and thus reduce the tendency to carry solid materials out of the furnace. The first furnace built carrying out these ideas was at the Iroquois Iron Co.'s works, Chicago. It aroused a great deal of interest, and the great majority of furnacemen who saw the plans of the furnace predicted that the top would blow off the furnace in a short time after starting. Others said either the top would blow off, or the bosh would be blown out. None of these predictions have come true. The furnace stood the heaviest sort of slips, and a slip that on the ordinary furnace would have thrown out twenty tons or more of stock, would not throw 300 pounds of lumps into the dust catcher. The fact that the rush of gases is controlled to a certain extent also causes less disarrangement of the stock in the furnace, so that with a slip of a given magnitude there is less derangement of the working of the furnace and less tendency to change the grade of the iron made. There are now in operation 24 furnaces of this general construction, shown by Fig. 3. Wherever possible, I have installed them without relief doors on gas mains, though in some cases, owing to insistence of managers, who were "almost persuaded" that the general scheme was all right, I have had to put on relief doors on dust catchers or on gas mains. In some cases no relief is given except at stove and boiler burners and at the bleeder, and in some cases the bleeder has a positive valve, so that the only openings for the passage of the gases are those of the burners at boilers and stoves.

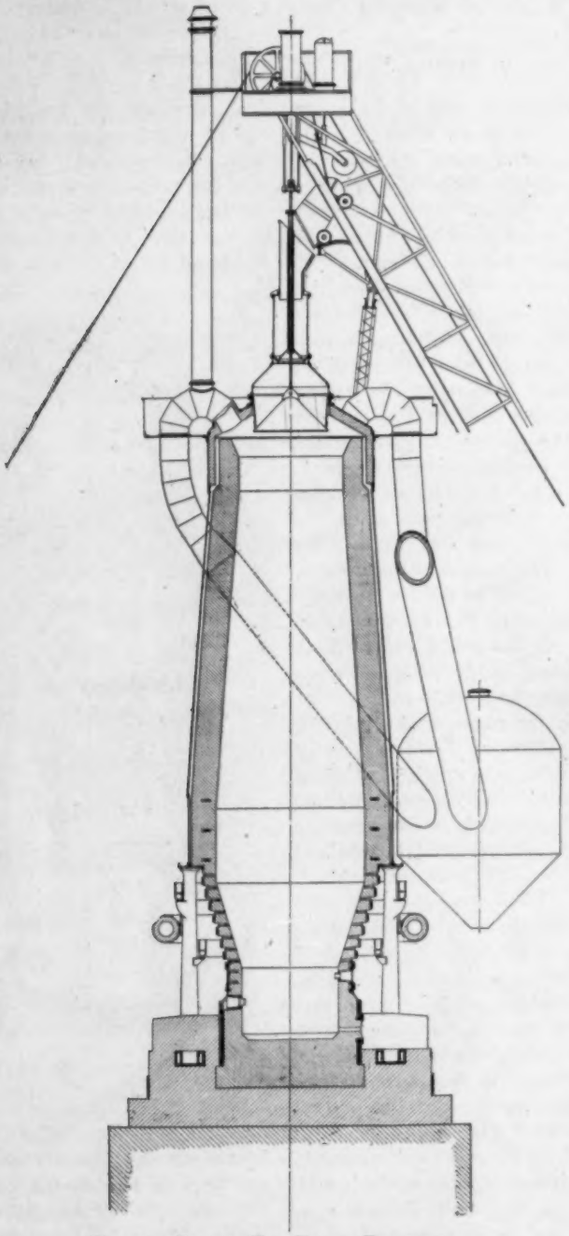


FIG. 3.—CLOSED TOP BLAST FURNACE.

These furnaces have demonstrated, beyond a shadow of a doubt, that it is absolutely safe to altogether close the top of the blast furnace, and that the letting loose of great volumes of dust and lumps of stock at this point is entirely unnecessary. It has been said that even if the dust is all brought down the downcomers, it will pass through the stoves and boilers, and thus be scattered over the surrounding country. Some of it, of course, will, if no arrangements are made to stop it, but a large proportion of it can be caught in very simple dust catchers, and since gas engines have been installed at furnaces, there have also been started gas washers so perfect that they will take gas from a furnace running on a mixture consisting largely of Mesabi ore and cleanse it till it has less dust in it than the ordinary atmosphere. So that given a device that brings all the gases down to the cleaning apparatus, it is entirely feasible to do away with the dust absolutely. As far as I am aware, not a single man has ever been burned on the top of any of the above mentioned 24 furnaces, or burned or injured by material thrown from their tops; nor have any of them bursted at any other place, or shown any indication that the strains on the bottom of the furnace have been increased by closing the top. In the light of what has been demonstrated, there surely can be no excuse in the future for burning men on top of furnaces, or burning or otherwise injuring them with materials thrown out of the tops of furnaces because of slips, and the amount of dust sent out from a furnace will depend entirely on how perfectly the management choose to cleanse the gas by means of dust catchers and washers, which have at the present time been developed to a degree of perfec-

THE IRON TRA

LAKE SUPERIOR IRON ORE SHIPMENTS (Gros

NAME OF MINE.	1906	1905	Prior to 1890	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	TOTALS.
Mesabi Range																			
Adams	1,238,350	1,140,984							59,141	234,562	170,738	390,860	720,474	777,346	829,118	1,242,923	1,109,750	940,105	8,854,351
Adriatic	3,294																		3,294
Aetna (Lowmore)							1,645			17,723						196,316			215,684
Agnew	163,260	44,681														45,582	108,847	96,435	458,775
Ajax (Kanawha)	9,657	28,439											14,963	64,218	41,300	24,829	23,982	912	207,650
Albany	356,371	241,186															109,608	153,433	860,598
Alexander	60,547	15,073																	75,620
Auburn								108,210	376,970	131,478	175,263	235,630	385,992	263,692	427,510	38,283			2,143,928
Bessemer	131,791	112,630																86,303	330,724
Biwabik	807,374	1,092,987					151,500	90,048	247,069	242,565	427,464	383,180	553,836	924,868	410,074	623,127	807,511	647,614	7,409,217
Brunt	75,401																		75,401
Burt	1,377,066	1,860,452																	3,237,518
Canton							24,416	213,853	359,020	16,261			99,498						713,048
Cass	65,961	50,552															50,155	29,554	205,222
Chisholm	379,156	231,296													34,573	200,629	168,831	130,732	1,145,217
Cincinnati	373	965					26,372		17,187	57,324	32,912		246						136,379
Clark	274,394	258,091												63,071	199,566	350,799	300,492	256,873	1,803,286
Cloquet (Vega)								5,628	47,700	96,280	12,215		1,621						163,444
Columbia		1,360													15,627				16,987
Commodore	283,401	146,901					65,137	7,213		22,063	60,798	80,494	152,947	278,416	35,546	65,833	20,436	249	1,199,434
Corsica	100,606														26,838	59,292	34,043	30,131	250,910
Crosby	115,373																		115,373
Croxton	162,533	130,228														18,594	100,297	348	412,000
Cyprus	192,144	235,351															121,818	244,343	793,656
Day												18,651	1,975			106,516	107,781	84,530	319,453
Duluth	158,356	142,172					37,626					112,155	165,438	128,587	150,024	150,220	150,053	149,819	1,344,427
Elba	255,580	125,724										564	9,547	121,707	224,630	207,454	93,616	123,425	1,162,247
Fayal	1,634,853	1,358,922							136,601	248,645	642,939	575,933	1,072,257	1,252,504	1,656,973	1,919,172	1,460,601	975,102	12,934,502
Forest	41,647	99,785																85,280	226,712
Franklin	66,936						46,617	223,399	286,423	231,086	30,128	200,400	60,000	168,524	39,299	111,085	92,019	65,528	1,621,443
Frantz	11,058	70,210																62,884	144,152
Genoa	179,468	281,081								17,136	309,514	279,677	276,559	263,651	332,022	399,719	303,700	244,150	2,876,077
Glen	279,424	287,835														23,875	171,705	280,412	1,043,251
Grant		49,227														51,946	18,928	44,413	164,514
Hawkins	294,588	202,070														5,892	107,906	99,055	709,510
Hector (Hale)	37,221	4,996					3,616	24,167	31,004	70,006	13,728		18,807	32,901	30,929	54,289			321,658
Higgins No. 2	341,319	238,598																35,286	615,203
Hobart	975																		975
Holland	95,472	158,484																	253,956
Hull	282,592	233,065																	515,657
Hull-Rust	1,690,311																		1,690,311
Iroquois	190,971	61,109															17,562	50,215	319,857
Jennings	84,715																		84,715
Jordan	110,738	185,854														147,931	190,024	97,474	732,091
Kinney	57,691	82,161															32,352	6,225	185,429
La Belle	50,466	78,597														70,753	48,298	89,554	337,668
Lake Sup. Group									58,123	67,659	259,912	135,404	154,326	284,023	594,761	766,311	1,226,066	1,415,884	4,962,469
Larkin (Tesora)	12,091																		12,091
La Rue	175,670	197,192															53,335	105,170	531,367
Laura	138,001	27,207														16,453	79,286	3,778	264,725
Leetonia	308,989	352,004														28,784	200,163	228,536	1,118,476
Leonard	254,348	297,011															10,591	151,952	713,912
Lincoln	367,192	275,777														87,908	279,399	153,822	1,164,098
Longyear		16,778														22,788	81,604	221	121,391
Mahoning	1,274,222	1,011,661							117,884	167,245	519,892	520,751	750,341	911,021	765,872	1,038,645	1,009,446	706,325	8,793,315
Malta	115,763	139,853											28,615	65,346	126,299	222,640	11,675	66,641	776,832
Mayas	107,244																		107,244
Miller	234,071	113,520																	347,591
Minorca	155,541	117,653														35,496	115,886	121,739	546,318
Mohawk	92,715																		92,715
Monroe	310,859	13,730																	324,589
Morris	1,809,743	1,070,937																	2,880,680
Morrow	61,073	60,725																	242,790
Mtn. Iron	2,536,249	2,495,089				4,245	119,818	573,440	371,274	142,021	773,538	650,955	1,137,970	1,001,324	1,058,160	1,421,456	1,348,714	1,168,855	14,803,116
Myers	228,451	188,568																	417,019
Norman								33,099	93,392	77,528	101,077	110,141							421,132
Ohio									28,943	69,925	47,350	101,607	293,651	172,097					714,073
Pearce	66,386															54,884	50,204	235	171,709
Penobscot											11,933	29,652	85,619	146,641	221,080	209,531	1,615		706,071
Pettit	82,757	140,239														17,278	52,706	27,088	320,068
Pillsbury	33,546	161,924										99,691	106,487	101,032	120,723	238,122	229,133		1,090,658
Roberts											18,614		57,847	41,965	42,786	28,972			190,184
Rust	284,547	272,114																	556,631
Sauntry-Alpena													53,004	68,560	328,739	249,837			700,140
Scranton																		1,168	1,168
Sellers	241,031	261,501							47,433	153,037		112,765	174,867	56,280	34,918	193,428	251,631	207,990	1,734,881
Sharon															56,810	224,526	48,199		329,535
Shenango	383,717	213,097																51,712	648,526
Sparta	235	27,777										66,722	226,156	237,143	202,144	156,426	227,444	40,458	59,692	1,244,197
Spruce	674,602	606,295													101,675	279,515	543,203	587,153	589,319	3,381,762
St. Clair		61,792																6,148	26,748	94,588
St. Paul	24,230																		24,230
Stephens		367,764															87,055		454,819
Stevenson	1,014,509	1,428,614																	7,266,702
Susquehanna	20,984															56,031	666,273	1,434,681	1,014,582	1,652,021	20,984
Tener	174,309	58,136																	234,445
Troy	146,849	37,584																	202,291
Union	20,691																15,099	12,759	317,115
Utica	268,281	185,944														8,297	91,496		740,111
Victoria	64,820															93,109	103,522	91,496	64,820
Virginia (Oliver)	5,674	402,224					125,015	505,955	500,377	808,291	601,072	349,100					9,009	156,180	3,562,396
Wacoutah	6,766																	120,697	6,766
Webb	165,604	71,235												244,876	5,420	5,131	5,866	5,395	236,839
Williams (N. Cin'ti)	17,685								3,046	11,249			12,357	18,238					62,575
Wills		4,550																	16,708
Winnifred	3,415															12,158			124,280
Yates	265,289	58,174															39,179	81,686	376,642
Miscellaneous							13,358	2,140										53,179	15,998
Total	23,792,882	20,153,699				4,245	613,620	1793,052	2,781,587	2,882,079	4,275,809	4,613,766	6,626,384	7,809,535	9,004,890	13,342,840	12,892,542	12,156,008	122,742,938
Gogebic Range.																			
Anvil	79,493	82,118	81,751	45,690	73	42,090		13,297	68,064	57,483		5,037			1,101	135,502	11,309	45,595	668,603
Ashland	341,841	409,131	688,417	435,949	267,439	231,896	66,067	83,020	126,096	91,149	111,625	123,208	154,615	232,961	286,399	301,824	274,138	344,102	4,569,877
Atlantic	97,689	206,039	1,369						70,989	60,727	50,307	33,058	19,964	135,955	190,135	190,213	148,385	77,224	1,289,054
Aurora			639,029	246,695	83,554	319,482	179,028	203,152	245,883	187,169	166,122	133,076	170,369	193,111	223,747	402,981	355,365	212,920	3,961,683
Brotherton	147,281	137,351	124,507	80,486	46,574	130,833	18,905	47,148	40,567	50,490	46,186	73,198	78,858	89,804	103,109	53,255	94,986	84,870	1,448,408
Cary (and Superior)	216,992	146,414	128,446	116,203	121,186	106,484	28,578	16,559	52,349	38,821	37,308	43,162	62,524	125,496	179,374	136,895	89,221	61,860	1,707,872
Castile	2,108																		2,108
Chicago										504				633		44,625	22,965		68,727
Colby	113,001	83,736	1023,987	193,038	9,619	69,968	59,346	32,616		48,492	22,921	152,875	103,239	32,572	23,475	22,526	54,915	81,141	2,127,467
Davis (Wisconsin)		3,160		1,497		21,754	15,210		10,253				5,029	3,569		31,530	734	11,225	103,961
Eureka	37,525			23,794	13,907	10,655	31,385	18,329	26,105	4,544									166,244
Geneva																	7,108		7,108
Harm'ny (G'rm'nia)	9,436	2,973	244,003	52,000	22,383	4,283	7,964				1,015		1,255	986	10,358	20,502	2,246	23,364	402,768
Hennepin	5,768	2,589	105,266	63,903	15,759									7,728	21,475	36,383	862		259,733
Iron Belt	8,227		81,551	110,368	1,506	161,635	23,976	45,109	148,228	81,351	96,763	58,418	105,934	54,664	43,883	79,121	25,353		1,121,987
Ironton	106,158	41,314	51,821	6,247	300								7,977	25,047		8,555	16,875	23,197	287,491
Jack Pot						3,944	1,651				1,265			33,893	19,988	102	31,709	6,538	99,090
Meteor (Comet)				2,882	10,144	54,779	9,604	11,782					332	7,844	34,140	19,117	6,156	59,587	216,367
Mikado	154,043	140,740							4,788		11,397		10,324	1,090	91,846	98,834	108,709	25,611	647,382
Montreal	139,202	107,854	221,111	143,691	108,684	73,409	34,299	46,637	138,882	131,531	191,106	270,776	153,307	107,524	72,945	136,354	93,139	163,021	2,332,872
Newport	549,745	438,023	201,976	71,488	105,606	165,962	109,718	150,392	157,821	142,369	150,979	196,953	263,711	217,201	190,448	141,571	279,906	171,931	3,709,99
Norrie Group	1,244,468	1,527,128	1464,107	906,728	758,572	985,216	472,062	621,608	738,480	329,068	604,281	700,990	714,669	666,389	660,965	1,080,032	790,346	618,638	14,383,747
Ottawa (Odanah)	57,219	21,986	62,955	1,065		6,711	3,956	2,437								26,141	87,929	30,420	300,819
Pabst			205,340	172,060	130,226	113,245	104,510	206,074	219,960	68,984	220,496	223,891	263,869	239,242	198,686				2,366,83
Palms	5,622	13,953	46,384	50,604	32,227	102,382	2,658	37,911	46,965	114,108	207,153	175,925	154,706	139,658	7,603	32,113	60,800	53,718	1,284,489
Pence			27,261							13,185	120								40,566
Pike	17,934	11,161															3,434	6,346	6,343	115		45,333
Puritan (Ruby)			73,918	11,694	913										21,788			1,259	109,572
Shores										12,196	16,102	15,691	11,819						55,808
Sunday Lake	86,578	79,209	30,505	6,010	64,902	56,046	22,876	34,323	20,970	89,441	45,815		12,526	74,097	89,997	144,630	91,383	50,625	1,000,234
Tilden	169,697	188,104			28,415	233,356	135,118	209,077	418,188	250,205	276,890	287,203	500,830	481,909	446,670	468,672	211,534	204,581	4,510,449
Upson																11,065	310		11,375
Windsor			43,211	37,210	97	53,242	2,474		11,438	28,154	385			488	84				177,510
Yale (West Colby)	56,697	60,224													12,836	26,043	46,211	46,900	248,831
Miscellaneous			95,697	68,508	17,488	24,619		30,597	1,950										238,859
Total	3,641,965	3,705,207	5642,612	2847,810	1839,574	2971,991	1329,385	1809,468	2,547,976	1,799,971	2,258,236	2,498,461	2,795,856	2,875,295	2,938,155	3,654,929	2,912,708	2,398,287	50,467,906
Miscellaneous — (In Wisconsin)																			
Iron Ridge	61,534	39,978	2,320														17,913	19,558	141,303
Illinois	67,116	71,413																47,922	186,453
Total	128,742	111,391	2,320														17,913	67,480	327,846

TRADE REVIEW

S (Gross Tons) FOR 1906 AND PREVIOUS YEARS.

NAME OF MINE.	1906	1905	Prior to 1890	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	TOTALS.
Menominee Range.																			
Alpha																	1,870		1,870
Antoine (Clifford)	195,855	138,395							27,931	110,821	98,847	104,510	93,025	119,940	63,429	110,993	107,886	81,164	1,282,796
Aragon	431,000	423,698	1,745	46,609	96,829	167,948	127,901	138,209	183,296	95,809	149,594	295,821	337,807	404,645	477,212	646,208	522,035	374,944	4,921,809
Armenia	27,882		50,275	26,649					2,045						18,750	100,864	31,901	16,577	274,943
Baltic	186,495	133,246													17,326	64,664	123,236	151,114	676,081
Breen	21,004	16,625	17,430																55,059
Bristol	298,031	210,388				57,352	9,612												1,252,595
Calumet	15,773												80,915	51,639	36,508	129,035	246,581	132,420	15,773
Caspian	80,875	10,248																	97,458
Chapin	943,425	902,628	2475,700	742,843	488,749	660,052	489,134	235,895	618,589	420,318	643,402	724,768	940,513	929,937	929,701	956,812	2,088	4,242	14,347,841
Columbia		27,883	66,096	60,133	70,770	57,682	22,426	10,300	70,967	87,202	24,623	14,199	126,280	97,531	19,963	186,798	704,051	541,324	942,705
Commonwealth	6,346	8,085	600,108	116,786	134,982	249,113	151,291	174,921	208,880	93,707	98,283	250,687	117,296	53,342	77,799	112,704	5,051	1,617	2,460,997
Crystal Falls	111,871	152,255	1,341	3,974					13,037	44,526	95,210	128,233	147,346	197,770	230,614	195,555	117,096	180,983	1,919,811
Cuff													20,210	38,209					58,419
Cundy										3,395	41,942	76,877	100,902	141,148	178,800	183,052	111,851		837,967
Dober												5,009	10,980	49,203					65,192
Dunn	91,476	21,051	294,601	156,983	162,721	133,606	58,590	24,538	90,885	47,081	31,062	49,381	7,456			2,816	5,365		1,177,664
Eleanor (Ap'l'ton)	3,121	1,819				4,377	5,618		2,107										17,043
Florence	169,459	233,858	741,494	218,570	48,806	48,246	9,634	2,726	22,820	35,136	37,594	93,663	74,235	35,756	15,395	130,798	95,877	153,452	2,167,519
Forest																		11,988	11,988
Genesee	80,971	77,370														14,455	61,694	132,380	366,870
Great Western	311,218	191,265	149,942	72,546	62,464	87,487	661			14,643		33,851	43,316	98,550	123,281	42,470	100,751	68,318	1,408,743
Groveland					1,049										11,444	7,589	1,294	4,737	26,123
Hemlock	106,437	124,450			35,531	65,459	11,325		949	94,645	96,032	69,865	110,269	72,413	149,966	123,331	79,420	136,232	1,270,352
Hiawatha	20	9,704					1,683		1,201					11,008	20,355	74,596	53,828	38,288	210,683
Hilltop	7,820												3,496	6,410	2,503				20,229
Hope						15,543	2,275									3,373	7,339		28,530
Keel Ridge			59,465			5,997	3,298		19,441				4,900						93,101
Lamont (Monitor)	89,989	74,991	12,348	31,139	26,226	42,819	13,777	2,600					67,652	31,323		47,267	43,736	29,393	511,251
Lincoln	5,890	19,539			1,813	26,019	8,757						43,622	72,959	19,727	7,747	15,606	17,577	239,256
Loretto	140,396	118,738					8,131	55,983	53,160	34,334	54,104	68,447	64,324	61,219	54,985	128,300	87,939	54,720	885,274
Mansfield		38,584		18,303	49,826	69,259	69,558				37,182	60,739	86,607	90,155	74,113	31,181	51,440	79,163	790,120
Michigan Explo. Co.	146	58,088					505	77	1,071		216					53,272			113,375
Millie (Hewitt)	36,815		64,000	39,232	5,889	6,780		13,062	10,924	21,815	10,374	17,430	15,194	14,922	12,133	25,935	40,860		335,305
Monongahela															2,397		6,913		9,310
Munro	47,454	92,183															8,739		180,708
Nanaimo	91,792	91,238	110,925	3,441	13,200													32,332	319,028
Northwestern			17,206															9,986	26,810
Paint River	28,321	11,973	95,892	62,654	45,435	18,390								1,316		1,324	17,280		266,484
Penn Iron M'ng Co.	496,582	423,244														10,393	9,863	11,257	2,854,086
Pewabic	493,891	533,413		26,991	64,507	115,273	280,450	175,274	280,622	179,917	287,886	223,713	229,651	197,606	358,126	273,443	343,543	141,948	5,929,110
Quinnesec			283,323				165,745	304,010	262,551	273,587	279,855	305,072	530,129	374,043	507,786	530,291	489,175	372,791	469,756
Riverton	161,704	82,611							761				11,050	25,967	66,383	62,531	49,708	33	832,467
Saginaw (Perkins)	21,017		383,093	11,971					2,161				2,252	71,004	119,800	215,850	97,653	81,543	418,244
Sheridan			1,102	595	7,137	45,745	2,234		16,754	3,419	146		31,104	8,063					116,299
Tobin	235,867	166,529																	635,646
Verona														5,143	18,957	55,238	45,398	113,669	130,976
Vivian	122,577	90,426													11,476	43,245	50,910	20,202	346,863
Youngs	47,583	10,926														40,384	12,122	81,354	58,509
Youngstown			102,586	44,460	3,705				13		661								151,425
Miscellaneous			5009,040	598,378	504,970	384,262	23,594	354	3,733	112									6,544,473
Total	5,109,088	4,495,451	10537652	2282,237	1824,619	2261,499	1466,197	1137,949	1,923,798	1,560,467	1,937,013	2,522,265	3,301,052	3,361,221	3,619,053	4,612,509	3,749,567	3,074,848	58,676,495
Marquette Range.																			
American	419		55,253	21,000	21,604	15,076													113,352
Bessie	1,646	21,879			847											5,007	29,718		59,097
Beaufort		38,306	90,217													59,781	134,648	25,781	354,054
Blue														1,583	4,338				92,639
Breitung Hem. No. 2	38,071						13,809	32,171	44,140		2,519								86,394
Cambria	40,628	81,791	508,850	80,359	34,662	41,549	30,445	47,218	41,656	95,086	110,648	102,623	124,930	80,432	68,907	63,976	7,854	9,869	1,679,780
Champion	115,097	64,680	2,2-7,672	223,442	133,413	109,979	61,648	42,788	100,398	113,375	141,728	163,190	215,074	113,743	99,026	205,721	41,108	84,852	4,270,296
Chester R'll'g Mill		28,766	234,625								3,975			22,585	22,815	24,874	74,238	174	339,428
Cleve'd-Cliffs Gr'p	1,330,944	1,288,416	4,163,318	331,713	221,788	310,907	218,105	143,706	221,153	513,119	718,408	869,482	1,011,048	881,021	860,484	1,104,864	6,786		15,742,564
Dexter			27,546	9,136	5,448	13,000	7,833	21,740	13,752	18,903	1,154						810,845	745,263	118,512
East New York		33,095	43,433	36,431	50,293	35,175	911							27,987	31,696	38,761	22,523	7,299	327,804
Foxdale		3,303													4,647	15,015	5,053	3,429	31,447
Hartford	364,801	322,209	566	38,460	18,552	5,678	6,513			1,532						7,440	20,085	179,980	908,504
Imperial	5,076	1,661				7,194							23,235	62,321				727	187,226
Jackson	5,066	33,180	2,945,254	124,682	92,979	92,567	51,009	32,298	42,186	80,710	79,102	55,012	88,230	31,714	38,271	15,449	5,409		3,813,008
Lake Angeline	269,116	374,183	1,540,776	261,681	241,605	287,517	351,973	355,453	313,555	342,251	489,685	460,335	464,988	289,128	481,574	304,125	310,950	262,486	7,501,379
Lake Superior	635,671	727,378	4,724,140	318,321	308,831	366,715	329,610	344,758	342,439	459,576	376,761	686,563	682,595	709,143	635,642	832,796	604,829	590,339	13,476,197
Lillie	32,781	9,868	211,158	31,812	19,551	29,005	68,861	78,388	54,285	107,532	112,781	211,023	196,200	114,990	98,788	79,919	77,454	63,209	1,397,695
Lucy (McComber)	85		374,824	43,483	27,683	26,326	21,964				10,033	11,846							516,244
Magnetic	292																		292
Mary Charlotte	257,088	221,738															34,303	48,895	562,014
Moore														4,648	37,660			25,828	68,131
Negaunee	253,448	239,584	128,881	76,488	64,218	85,846	69,732	132,581	90,682	175,394	182,169	191,330	195,573	126,829	234,713	204,286	224,665	145,132	2,821,521
New York (York)			1,052,973	2,422		11,220	25,000	21,487					6,642	3,327					1,123,071
Ogden											986								986
Palmer	13,131									1,041									14,172
Princeton (Sw'ns'y)	166,894	129,079	154,696		7,301	29,403	19,096		6,595			25,247	55,802	75,037	67,051	118,045	84,223	76,461	1,014,931
Queen (Blue)	221,096	253,377	287,944	388,479	479,509	379,719	106,864	220,298	160,817	323,057	239,774	61,022	342,978	298,398	400,845	418,044	254,658	311,479	5,248,358
Republic	177,220	150,699	3,327,902	220,065	191,127	167,991	64,195	105,719	174,027	127,360	124,342	140,312	137,085	150,126	104,604	157,646	155,415	124,506	5,780,341
Richmond	89,563	86,129								1,088	4,030	24,464	4,513	51,303	54,181	60,041	55,593	68,134	489,739
Richards			1,374								6,887								8,261
Star West (Wheat)			95,036	15,141	4,412					9,658	942		6,716	15,987					204,849
Volunteer	38,544	106,281	529,423	141,524	92,699	127,130	69,561	26,946	51,207	53,216	1,617		29,983	47,578		32,736	7,395	71,870	1,409,178
Webster			14,108						32,672					20,797					84,905
Winthrop				109,576	122,042	191,658	180 071	134,365	119,129	150,496	106,894	122,592	171,318	148,945	109	129,496	72,433		1,756,115
Miscellaneous			6958,154	519,449	373,678	331,514	140,380	313,864	289,156	30,827									8,957,622
Total	4,057,187	4,210,522	2976812	2993,664	2512,242	2665,169	1837,580	2059,330	2,097,838	2,604,221	2,715,035	3,125,039	3,757,010	3,457,522	3,245,346	3,868,025	3,040,245	2,843,703	80,857,801
Vermillion Range.																			
Chandler	318,990	365,739	370,732	336,002	373,969	651,655	435,930	558,050	605,024	471,545	438,365	715,919	808,359	644,801	627,379	645,786	460,548	422,162	8 850,965
Pioneer	766,853	653,682	3,144	12,012	3,079	2,651			40,054	149,073	207,103	123,183	339,897	450,794	678,310	673,863	596,735	805,432	5,295,845
Savoy	106,933	91,775											81,022	170,446	212,008	243,937	169,616	74,866	1,150,603
Sibley	271,496	251,170											5,169	4,670		78,304	113,595	122,783	647,187
Soudan (Minnesota)	146,563	205,002	1,578,915	532,000	517,570	498,353	370,303	390,463	432,760	448,707	592,196	626,040	457,732	225,020	208,284	275,108	175,114	70,713	8,050,843
Zenith	181,580	109,818				14,991	14,388			18,765	40,817		79,323	60,089	60,062	167,205	161,091	86,557	994,706
Total	1,792,355	1,677,186	1,952,791	880,014	894,618	1167,650	820,621	948,513	1,077,838	1,088,090	1,278,481	1,265,142	1,771,502	1,655,820	1,786,063	2,084,265	1,676,099	1,282,513	25,100,160
GRAND TOTAL	38,522,239	34,353,456	46360393	9003,725	7071,053	9070,554	6067,403	7748,312	10,429,037	9,934,828	12,464,574	14,024,673	18,251,804	19,059,393	20,593,507	27,562,566	24,289,674	21,822,839	338,173,135

MINES NOT PRODUCING SINCE 1896.

MARQUETTE RANGE.

Ames	6,298
Barnum (Iron Cliffs)	801,851
Bay State	16,637
Boston	62,542
Braastad (Mitchell)	136,636
Braastad (Winthrop)	831,445
Chicago	9,012
Columbia (Klomin)	94,813
Curry	16,671
Detroit	140,841
Dey	2,709
East Champion	76,002
Edison	893
Erie	8,136
Etna	1,091
Fitch	31,817
Foster	171,893
Gibson	16,357
Goodrich	49,754
Grand Rapids (Davis)	110,736
Hortense (Champion)	30,554
Humboldt	723,961
Iron Cliffs	1,700,537
Iron Mountain	393
Manganese	6,359
Marquette	152,907
Michigamme	880,362
Milwaukee	375,451
Mesabi's Friend	16,043
National	150,216
Negaunee Con. Wks.	12,708
N. Republic	289
N. Y. Hematite	37,587
Northwest	1,687
Nonpareil	23,395
Norwood	5,753
Pascoe	59,806
Pendill	45,993
Phenix	59,114
Pioneer	15,409
Platt	73,844
Primrose	6,040
Quartz	491
Republic Reduction Co.	47,174
Riverside	16,160
Saginaw	451,424
Salisbury (Iron Cliffs)	686,411
Sam Mitchell	17,780
Samson (Argyle)	267,805
Schadt	1,261
Section 12	21,887
Spurr	164,244
Taylor	32,970
Titan	90,371
West Republic	133,077
Wetmore	50,870
Wheeling	10,555
Total	8,957,022

MENOMINEE RANGE.

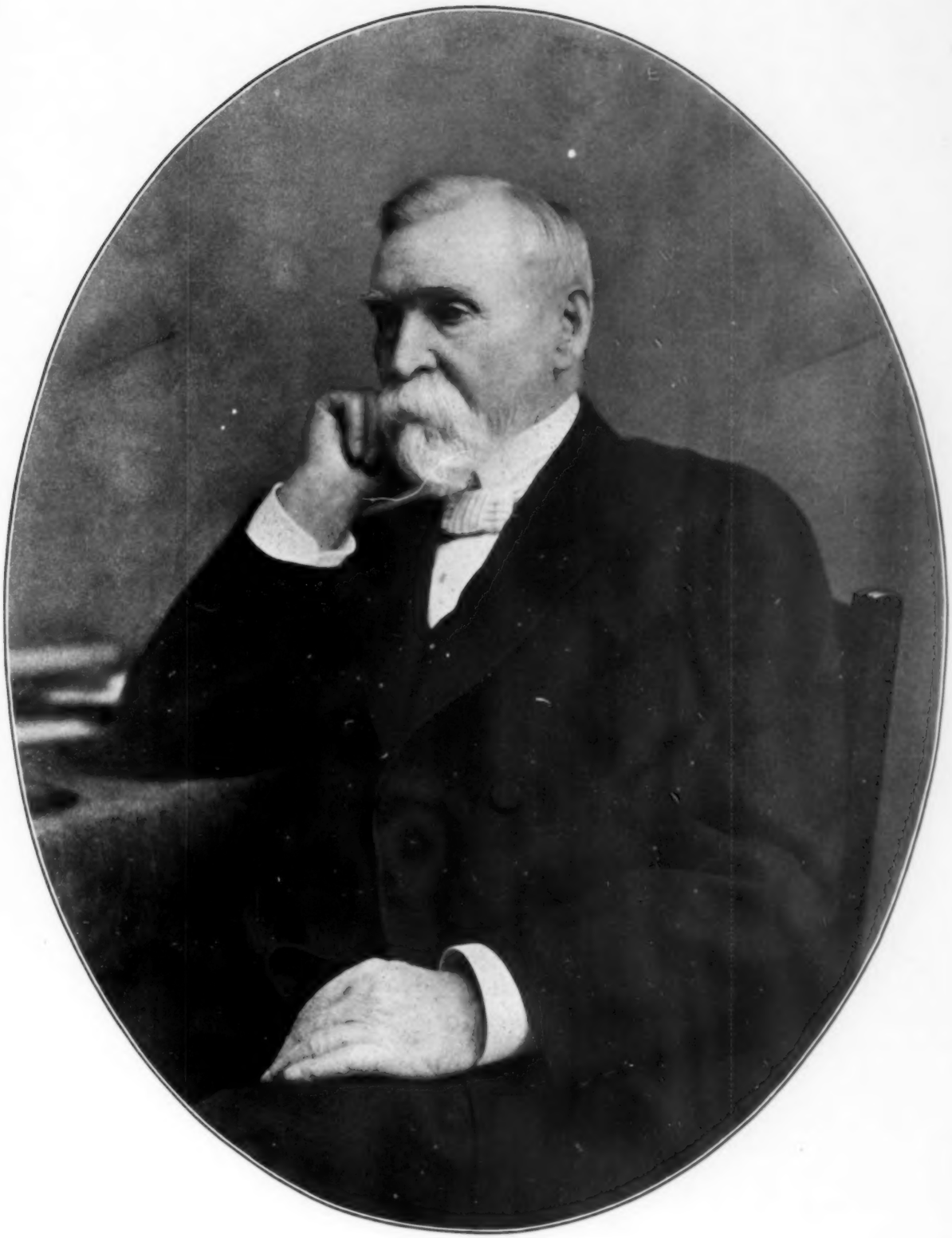
Beta	4,211
Brier Hill	14,981
Calumet	38,713
Cornell	49,302
Curry	416,928
Cyclops	286,093
Delphic	33,770
Emmett	66,655
Fairbank	8,500
Half and Half	7,524
Hamilton	96,072
Hersel	955
Hollister	4,098
Indiana	17,871
Iron River (Riverton)	904,587
Lee Peck	2,844
Ludington	1,001,518
Manganate	6,844
Mastodon	425,708
Metropolitan	107,027
Norway	1,291,352
Perry	3,138
Selden	2,092
South Mastodon	8,203
Stephenson	39,350
Sturgeon River	18,404
Vulcan	1,668,644
Walpole	19,089
Total	6,544,473

GOGEBIC RANGE.

Bessemer	20,889
Blue Jacket	1,799
Federal	36,443
First National	1,997
Iron Chief	12,199
Iron Chief No. 2	551
Sparta	4,863
Superior	121,627
Trimble	25,931
Tyler's Forks	10,683
Valley	1,878
Total	238,859

MESABI RANGE.

Minnewas	15,998



JOHN FRITZ

tion which will enable the top of a furnace draft stack to be cleaner, as far as dust particles are concerned, than the cleanest spot in Pittsburg is at present.

Discussion.

J. O. Handy: I would like to ask if fire brick in the upper part of the furnace where they are acted on by the gases are also sometimes disintegrated or rotted, as well as the iron and steel?

Mr. Kennedy: Not if the brick is free from iron and is of a good quality. Brick that has too much iron in it will sometimes disintegrate. There have been cases where brick in the upper part of the furnace have disintegrated, but with good fire brick there is not much trouble that way.

A. E. Anderson: Has the gas engine in connection with blast furnaces been developed enough to say that it will be a settled practice in the future?

Mr. Kennedy: I think that it undoubtedly will. It is coming very rapidly, and one of its good features is that it will cause people to clean their gas.

H. D. James: I would like to ask if there are any furnaces in the Pittsburg district equipped with this construction?

Mr. Kennedy: Yes, the Isabella furnaces, the Clairton furnaces and the Donora furnaces.

E. K. Morse: I would like to ask Mr. Kennedy to explain a little more of the modern furnace, and especially how much of the finer material and the lighter coke will go down the downcomer, if any, and what the action of that is when the pressure does not reach the top. We know that the ordinary furnace blows out great quantities of fine dust to a distance of a good many hundred feet. I would like a little more explanation of the action of the top of the furnace.

Mr. Kennedy: The action of a furnace equipped with relief doors at the top is that while throwing out a large amount of material through the doors, it will also throw a considerably larger amount of coarse material into the dust catcher than will the closed top furnace which cannot throw any material out at the top; that is, a furnace of the open top kind which throws two or three car loads of material through the relief doors will also throw much more material into the dust catcher than the closed top furnace will, with the same sized slip. Of course, both tops will throw considerable fine dust over into the dust catcher, but the closed top throws a good deal less coarse material, and I think less fine material, as well. In any event, whatever is thrown out is thrown into the dust catcher, and does not come down on anyone's head, so that the men around these furnaces or working on top of them, need pay no attention to whether they are hanging or slipping or not. Whereas, with the old kind of furnace, the man who goes on top when the furnace is hanging badly, takes the chance of being burned to death whenever he does it.

Mr. Morse: But closing the top of the furnace, or throttling it, holds the pressure down until there is time to equalize it, and as a matter of fact less dust is moved entirely.

Mr. Kennedy. Very much less dust, for the same reason that the waiter who pulls the cork entirely out of the bottle loses half the ginger ale, while the fellow who pulls it gradually does not lose a particle. It is like a triple expansion engine, when you get a high pressure of steam in the cylinder and receivers you cannot stop it instantly by throttling it at the usual point, but the steam in the receivers will go on through, and the engine will race unless you throttle it further along; and when you have 20 feet of the bottom of the furnace filled with compressed air, and that breaks up suddenly through the stock, there is no way to check it at the bottom, but you can throttle it automatically at the top if you make the exit as small as will allow the gas to pass through it during ordinary working. In this case, when there is an extraordinary rush of gas, the resistance of the small opening automatically throttles and holds it back, and for that reason it does not gather up and bring it near as much material as when a large, free opening is left for it. Slips which are of such extent when determined by measurement, as would in an ordinary open type furnace throw out 20, 30 or 40 tons of material, will not throw a tithe of that amount into the dust catcher in the case of the tight top furnace.

This system would prevent all egress of dust through the top of the furnace. Of course, dust comes down into the dust catcher, and if the gas is not cleaned properly it can pass through the boilers and stoves and get out at the top of the smoke stacks, but all dust that comes out around the top of the furnace is absolutely done away with. You could go by furnaces of this kind on a train and in many cases could not tell whether they were running or not by looking at the furnace, and the only way to judge would be to look at the top of the smoke stacks and see if there was any smoke coming out there.

Mr. Morse: Where are those furnaces you mentioned in Buffalo?

Mr. Kennedy: At the Buffalo & Susquehanna Iron Co.'s works. There is also the same at Punxsutawney, Du Bois, Cleveland, Toledo and two at Chicago.

Mr. Anderson: Is the electric furnace making any progress such as will make it a competitor of the blast furnace?

Mr. Kennedy: Not yet for the production of ordinary grades of iron. The electric furnace has a field in the production of high-grade special steel, such as tool steel, and steel for automobiles, but it cannot as yet compete with coke for the production of ordinary qualities of steel in large quantities, except under very extraordinary conditions as to water power. But even at the price charged at Niagara now it cannot compete with the blast furnace in making ordinary material.

C. H. Nesbit: I would like to ask if you do not think the future economy of the blast furnace will depend in great part on the utilization of the clean furnace gas. Calculations I have seen state that today there are about 20 to 25 horsepower per hour thrown away in gases for every ton of pig iron made per day. If I remember rightly, I think it was Sir William Ramsey who was so radical that he stated that in the future the blast furnace would be run as a gas producer and pig iron would be a by-product.

Mr. Kennedy: The gas engine using furnace gas produces about three times as much power as can be produced by putting the same gas under boilers, so that there is now a very distinct movement toward gas engines. The Edgar Thomson people are putting in some and the new plant of the United States Steel Company at Gary will have almost entirely gas engines. They will have a few steam engines for the purpose of starting up, but the bulk of the power will be furnished by gas engines, and in addition to blowing the furnaces power will be furnished from the furnaces to run the mills, which will be driven by electricity generated by gas engines; so that the only fuel they will use in the steel mills will be for heating the steel. The statement that pig iron will be a by-product is perhaps not so wild as it would at first seem.

Mr. Babbitt: Do you think that is a fair figure, 20 to 25 horsepower per hour for every ton of pig iron made per day given off in combustible gases?

Mr. Kennedy: Yes, I judge that the figures named are approximately correct.

Mr. Brashear: Do blast furnaces generate power in excess of what they need for their own immediate uses?

Mr. Kennedy: Yes, even with steam there is quite an excess of power. At the Duquesne works you will see a line of pipe laid from the blast furnaces to the mill, and they get probably 2,500 horsepower. If they had gas engines they would get many times that amount.

Gerald Flanagan: When the stock in the furnace has been hanging a long time and is arched over as he describes, I would like to ask Mr. Kennedy if, when the slip occurs, does that slip extend to the top of the furnace, or

does it arch over at some intermediate point again?

Mr. Kennedy: I think as a general rule the whole charge comes down. It starts to fall from the bottom, and it may be several seconds before it all gets down. I knew a man once who had the theory that if he could get an enormous opening in his furnace he could do away with all danger from slips. So he cut out not only his downcomers, but about six other openings, four or five feet in diameter, as many as he could all the way around, and he got the aggregate area of the openings equal to the area of the cross section of the furnace at the bosh, and he thought he had a model furnace. These openings had doors to hang shut, which would open when there was a slip. They had a slip, and before they could stop the blowing engines they had emptied that furnace to within twelve feet of the tuyeres. It had simply been poured out over the casting houses.

Mr. Flanagan: That seems to bear out what you said about the material being thrown out by the blast pressure and not by any kind of explosion.

Mr. Kennedy: I have never seen in a slip anything that to my mind seemed to be explosive. There have been explosions in furnaces when blown out, and when nearly empty a lot of air possibly got through the thin incandescent bed of fuel without being burned and mixed with the gases above, and then the whole business exploded. That was an explosion, and the bell went up 50 or 60 feet, and the jacket was rent open and all that sort of thing.

A. Stucki: It has been proven that furnace gas can successfully be used in gas engines, since we know how to wash it; also that gas directly used is far more economical than steam. But what I would like to know is the amount of heat units contained in the furnace gas with the point in view, whether it could not be used for commercial purposes.

Mr. Kennedy: I imagine that blast furnace gas is rather too weak to be used in this way. It has not much illuminating power, and has not heating power enough to use, for example, in open hearth furnaces, but it is an ideal gas for gas engines, simply for the reason that it is not so strong as some of the other gases. It would not be suitable for distribution in mains through cities, and the best possible way to use it is in gas engines at the furnace.

Mr. Babbitt: I could tell Mr. Stucki that the average blast furnace gas will run about one-half per cent hydrogen and 27 to 28 per cent of carbon monoxide. It has a value of about 85 to 90 heat units, while natural gas, which is practically all CH_4, will run over 1,000.

Mr. Kennedy: I might also say here that in the Gary plant it is my understanding that the gas will practically all, except what is used for the blowing engines, be turned into electric power, and the rolling mills will be run by electric motors and not by direct connected gas engines.

K. A. Muellenhoff: I would like to ask Mr. Kennedy if, in this throttling of gases, there is diminished to any appreciable degree this turning up and down of the whole charge, so that the working of the furnace is kept almost uniform, even if a slip occurs.

Mr. Kennedy: I think this action is materially diminished; I would not say that it is done away with. There must be quite a disarrangement in any case; but with the semi-control which this gives when a mass of this kind breaks loose and comes rumbling down, my observation has led me to believe that there is a material lessening of the disarrangement in the furnace and that there is somewhat less danger of making white iron the next cast.

A. E. Anderson: In view of the fact of the Connellsville coke having a rather short existence, will not the future require a modification in the height of the furnaces to meet the weakness of coke made from inferior coal as compared with Connellsville coke?

Mr. Kennedy: I think possibly if a furnace was going to use Pocahontas coke, it would be wise to make the furnace 10 or 15 feet shorter, but it is probable when the Connellsville coke gives out there will be a large increase in by-product coke, which is even stronger than Connellsville coke, so far as crushing strength goes.

Mr. Muellenhoff: What is the length of time of a charge going through the whole furnace, from the time it is charged until it comes out as iron and slag?

Mr. Kennedy: I could not tell very well without figuring up the amount that is in the furnace at a time. I suppose it runs 12 to 15 hours, maybe more and maybe less.

Mr. F. Z. Schellenberg: It is surprising to hear that it takes 13 tons of wind to make a ton of iron. That startled me when I first heard it. Is it true?

Mr. Kennedy: It takes about six pounds of air to burn one pound of coke, and if a furnace is making iron with a pound of coke to a pound of iron, about six tons of air would be required per ton of product.

A Member: Is not the hanging sometimes caused by the material sticking to the sides of the furnace without arching?

Mr. Kennedy: Sometimes material will stick to the sides of the furnace, but that is not very usual. As a general rule an arch in a furnace hangs a while and then breaks and comes down, and it is not usual to get what is called a scaffold—a lump hanging on to the sides of the furnace—though this sometimes happens.

PRODUCTION OF CORNWALL IRON ORE.

The following statement shows the production of iron ore, in gross tons, by the Cornwall ore mines, from the time they were first opened in 1740, to Jan. 1, 1907, the information having been compiled by the American Iron & Steel Association:

From 1740 to 1790, about 300,000 tons; from 1790 to 1848, about 700,000 tons; from April 1, 1848, to Jan. 1, 1853, 173,190 tons; from Jan. 1, 1853, to Feb. 1, 1864, 1,351,717 tons; from Feb. 1, 1864, to Jan. 1, 1907, 19,662,692 tons, of which 763,788 tons were shipped in 1906 and 617,060 in 1905.

New Steel Foundry.—The Ohio Steel Foundry Co. has been organized under the laws of the state of Ohio, with a paid-in capital of $400,000, and will at once erect a modern, up-to-date steel foundry at Lima, O., with an initial capacity of 1,000 tons per month. The plant will be equipped with all the latest devices and will have ample capital to provide for the economical production of high-grade steel castings. J. E. Galvin Jr., manager of the Franklin (Pa.) plant of the American Steel Foundries, has resigned to accept the position of vice president of the new company. John W. Kaufman, Columbus, O., is secretary and treasurer. Harry Wright, Sharon, Pa., at present district manager of all the plants of the American Steel Foundries located in the Pittsburg district, will be the president.

Will Double Its Capacity.—The St. Louis Malleable Casting Co., St. Louis, manufacturer of malleable and gray iron castings has decided to double the capacity of its plant and will erect two new buildings, respectively, 320 x 60 feet and 120 x 80 feet. The cost of the improvements approximates $25,000 and arrangements have been made for the employment of 250 additional men by March 15. Officers have been elected by the company as follows: Geo J. Kobusch, president; Geo. C. Diederich, first vice president; Edward Westen, second vice president; Chas. G. Ette, secretary and treasurer.

The clearing of the Chicago traction situation and the defeat of Mayor Dunne will put the Union Traction Co. and the Chicago City Railway Co. in the market for new cars.

THE ART OF CUTTING METALS[1]

(Continued from last week.)

By Fred W. Taylor.

FORGING AND GRINDING TOOLS.

This paper is of necessity so voluminous that the subject of drilling metals will not be dealt with. But as confirming the conclusion drawn from our pressure experiment, that the pressure per square inch increases as the chip becomes thinner, we reproduce in Fig. 73, a diagram showing the results obtained by Professors Bird and Fairfield, of the Worcester Polytechnic Institute of Massachusetts, in their experiments on the power and pressure required in drilling cast iron.[2]

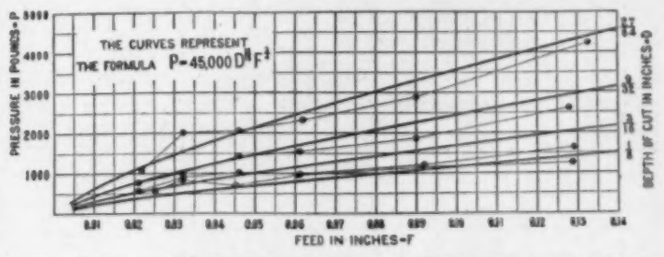


FIG. 70.—DETAILS OF EXPERIMENTS UPON THE PRESSURE OF THE CHIP ON THE TOOL IN CUTTING SOFT CAST IRON.

Tool used, standard ½-inch round nose roughing tool, clearance angle six degrees, back slope eight degrees, side slope 14 degrees, shown in Fig. 23, with various feeds and depths of cut. Cutting speed about 60 feet per minute. Experiments made at the shop of William Sellers & Co., Philadelphia, in 1902. For the exact pressures recorded in these experiments and their equivalents in pounds per square inch of sectional area of the chip see table 68. For the chemical composition and physical tests of the cast iron experimented upon see table 68.

The diagram gives the twisting moments recorded in drilling a ⅝-inch hole with feeds varying from 0.004 inch to 0.02 inch, and the curve shown represents the formula (developed by Mr. Barth),

$$M = 1{,}470\ F^{\frac{3}{4}}$$

in which M = the twisting moment in inch-pounds; and F = the feed in inches per revolution.

It is evident that this twisting moment is directly proportional to the pressure of the chip against the lips of the drill; and hence this resistance is also proportional to $F^{\frac{3}{4}}$ But this exponent $\frac{3}{4}$ is even smaller than the exponent $\frac{3}{4}$ for F in the formula developed by Mr. Barth to cover the results of our experiments on cutting pressures on cast iron, and thus indicates a proportionally still greater increase of the pressure with a decrease in thickness of the chip; or, what is the same thing, a proportionally still greater decrease in the pressure with an increase in the thickness of the chip.

This experiment confirms the results obtained by us that the pressure increases as the chip becomes thinner, as against the conclusions arrived at in the Manchester experiments.

The Effect of the Size of the Standard Tool Upon the Pressure of the Chip on the Tool.

In Fig. 71 are plotted the pressures obtained in cutting a piece of soft cast iron while using one of our standard 1¼-inch tools. In Fig. 70 are plotted a corresponding series of pressure determinations made upon the same piece of cast iron and using a ½-inch tool. These two sets of experiments were purposely made upon exactly the same piece of cast iron to determine the effect of the size of the nose of the tool upon the pressure. The results very clearly confirm the conclusion given above, namely, that the pressure increases as the thickness of the crip diminishes.

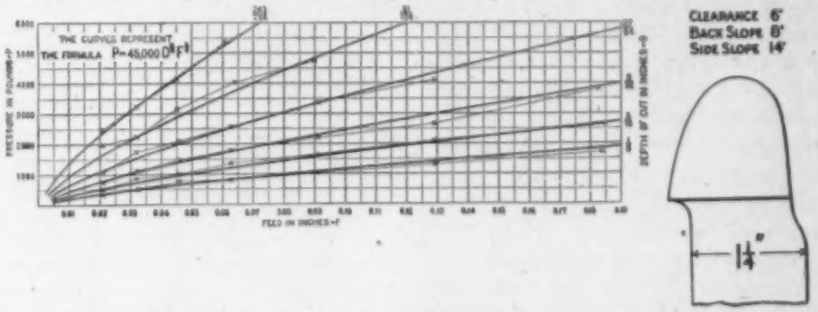


FIG. 71.—DETAILS OF EXPERIMENTS ON THE PRESSURE OF THE CHIP ON THE TOOL IN CUTTING SOFT CAST IRON.

Tool used, standard 1¼-inch round nose roughing tool, clearance angle six degrees, back slope eight degrees, side slope 14 degrees, with various feeds and depths of cut. Cutting speed about 60 feet per minute. Experiments made at shop of William Sellers & Co., Philadelphia, in 1902. For exact pressure recorded in these experiments and their equivalents in pounds per square inch of sectional area of the chip see table 67. For the chemical composition and physical tests of the cast iron experimented upon see table 67.

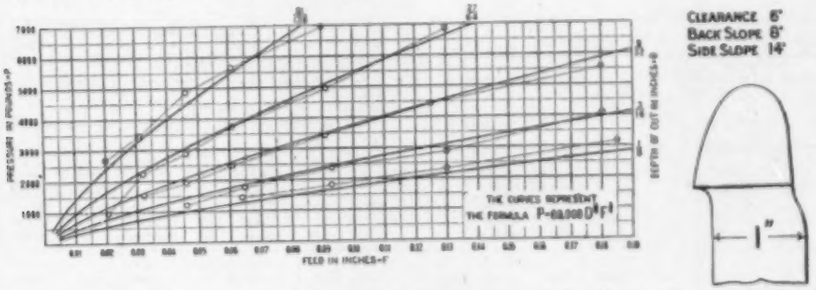


FIG. 72.—DETAILS OF EXPERIMENTS ON THE PRESSURE OF THE CHIP ON THE TOOL IN CUTTING HARD CAST IRON.

Tool used, standard 1-inch round nose roughing tool, clearance angle six degrees, back slope eight degrees, side slope 14 degrees, shown in Fig. 22, with various feeds and depths of cut. Cutting speed about 60 feet per minute. Experiments made at shop of William Sellers & Co., Philadelphia, 1902. For exact pressures recorded in these experiments and their equivalents in pounds per square inch of sectional area of the chip see table 67. Note that the formula for the pressure in cutting hard cast iron is the same as that for cutting soft cast iron, except for the coefficients, which are equal to 69,000 for hard and 45,000 for soft. See Figs. 88, 89 and 90. Silicon 1.2 per cent, tensile strength 24,000 pounds.

Earlier in the paper we have indicated that in using a large sized tool with a given depth of cut and feed, the chip is thinner than in using a small tool, and that as the depth of cut increases, the difference in the thickness of the chip becomes more marked when taken by a large tool than by a small tool. Now, by referring to Fig. 71, with depth of cut of $\frac{31}{64}$ inch, in which a large tool was used, it will be noted that all of the spots lie almost directly upon the line of the curve, whereas by referring to the corresponding diagram, Fig. 70, for the small tool, it will be seen that

[1]Presidential address, A. S. M. E., 1906.
[2]Trans. A. S. M. E. XXVI, page 362.

these spots lie considerably below the line, thus showing lower pressures corresponding to a greater thickness of chip.

When shallow depths of cut are taken, there is comparatively little difference between the thickness of the chip as taken by the small tool and the large tool, and here it is obvious also that the pressures obtained with the two tools more nearly correspond.

The Effect of a Thin Chip and Shallow Depth of Cut in Increasing the Pressure on the Tool is the Same for Hard as for Soft Cast Iron.

In table 67 and Fig. 71 will be noted the actual pressures obtained in experiments, on the one hand, on soft cast iron, and on the other hand, on hard cast iron; and in Figs 71 and 72 are recorded graphically the same data. These diagrams together with the formula beneath them, which represents the two sets of experiments, indicate that generally speaking the effect upon the pressure of the chip on the tool of thinning the shaving and of making the depth of cut shallow is the same for hard as for soft cast iron. The only difference between the two is that the pressures are uniformly higher in cutting hard than in cutting soft cast iron. This fact will be seen in detail by a comparison of the following figures.

If we select from the table of pressures on the soft cast iron a light and heavy cut, and a similar light and heavy cut from the table for hard cast iron, as follows:

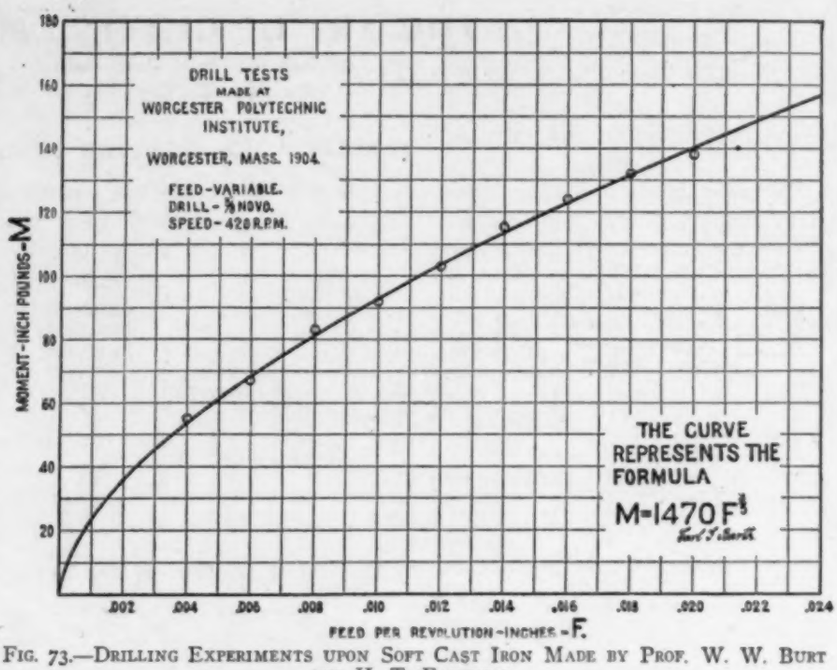


FIG. 73.—DRILLING EXPERIMENTS UPON SOFT CAST IRON MADE BY PROF. W. W. BURT AND H. T. FAIRFIELD.

The results of these experiments corroborate the results of Taylor's experiments on the pressure of the chip on the tool in turning cast iron, showing that the pressure per square inch of sectional area of the chip becomes greater as the chip becomes thinner.

	Depth of cut in inches	Thickness of feed in inches	Total section of chip in square inches	Pressure in lbs. on tool per square inch of sectional area of chip
Soft Cast Iron	⅛	0.0635	0.07785	114000
" " "	1/12.8	0.0909	0.05695	78000
Hard Cast Iron	⅛	0.064	0.008	178000
" " "	1/12.8	0.09	0.05695	122000

It will be noted that the relative pressure on the chip in the two cases are approximately the same. This is indicated by the following proportion, the figures of which are taken from our tables:

Pressure per sq. in. soft cast iron thin chip (114,000) : Pressure per sq. in. soft cast iron thick chip (7,800) = Pressure per sq in. hard cast iron thin chip (178,000) : Pressure per. sq. in. hard cast iron thick chip (122,000)

A comparison of the two formulae given below for soft cast iron and hard cast iron show clearly that the ratio is the same between the two for the different hardnesses of iron.

For soft cast iron $P = 45000\ D^{\frac{14}{15}} F^{\frac{3}{4}}$
For hard cast iron $P = 69000\ D^{\frac{14}{15}} F^{\frac{3}{4}}$
or

$$\frac{69000\ D^{\frac{14}{15}} F^{\frac{3}{4}}}{45000\ D^{\frac{14}{15}} F^{\frac{3}{4}}} = 1.533$$

TABLE 74.—PRESSURE OF THE CHIP ON THE TOOL IN CUTTING STEEL WITH STANDARD ROUND NOSE TOOLS.

Clearance angle six degrees, back slope eight degrees, side slope 14 degrees, shown in Figs. 18, 23, 25, and 26, with various feeds and depths of cut.

	¼" TOOL. CUTTING SPEED ABOUT 60' PER MINUTE. SEE FOLDER 13, FIG. 96				⅜" TOOL. CUTTING SPEED ABOUT 30' PER MINUTE. SEE FOLDER 13, FIG. 94				½" TOOL. CUTTING SPEED ABOUT 60' PER MINUTE. SEE FOLDER 13, FIG. 95				¾" TOOL. CUTTING SPEED ABOUT 30' PER MINUTE. SEE FOLDER 13, FIG. 97				PRESSURE IN POUNDS, FIGURED BY FORMULA—230,000 $D^{\frac{14}{15}}$. COMPARE THESE PRESSURES WITH THE EXPERIMENTAL PRESSURES IN THE OTHER FOUR COLUMNS OF THIS TABLE			
DEPTH OF CUT IN INCHES	EXPERIMENT NUMBER	FEED IN INCHES	PRESSURE IN POUNDS: ON TOOL	PRESSURE IN POUNDS: PER SQ. IN.	EXPERIMENT NUMBER	FEED IN INCHES	PRESSURE IN POUNDS: ON TOOL	PRESSURE IN POUNDS: PER SQ. IN.	EXPERIMENT NUMBER	FEED IN INCHES	PRESSURE IN POUNDS: ON TOOL	PRESSURE IN POUNDS: PER SQ. IN.	EXPERIMENT NUMBER	FEED IN INCHES	PRESSURE IN POUNDS: ON TOOL	PRESSURE IN POUNDS: PER SQ. IN.	FEED IN: FRACTIONS	FEED IN: DECIMALS	PRESSURE IN POUNDS: ON TOOL	PRESSURE IN POUNDS: PER SQ. IN.
1/8	565	0.0154	586	304000					435	0.0144	605	336000	541	0.0186	709	309000	1/64	0.01562	593	303550
	566	0.0205	1040	273000					434	0.0281	907	258000	542	0.0296	1124	304000	1/32	0.03125	1122	289842
	567	0.0422	1720	328000	535	0.0460	1537	267000	433	0.0428	1286	240000	543	0.0448	1615	286000	3/64	0.04687	1653	282054
	568	0.0625	2120	271000					432	0.0606	1928	254000	544	0.0608	1930	253000	1/16	0.06250	2162	276754
	569	0.0909	2850	250000	534	0.0909	3230	284000	431	0.0888	3175	286000	545	0.0930	3230	278000	5/64	0.07875	3156	269314
					534½	0.1282	4138	256000	430	0.1275	3855	242000	546	0.1250	4510	286000	⅛	0.12500	4129	264256
3/16	570	0.0166	903	319000					415	0.0115	736	341000	552	0.0156	865	296000	1/64	0.01562	889	303550
	571	0.0275	1400	271000					414	0.0280	1345	256000	551	0.0300	1496	286000	1/32	0.03125	1698	289842
	572	0.0420	2090	341000					413	0.0414	2238	288000	550	0.0440	1986	241000	3/64	0.04687	2479	282054
	573	0.0625	3100	265000	523	0.0314	1542	262000	412	0.0625	3020	258000	549	0.0632	2780	237000	1/16	0.06250	3243	276754
					520	0.0625	2721	222000	411	0.0882	4684	295000	548	0.0909	4600	270000	5/64	0.07875	4734	269314
					521	0.0885	4150	250000	416	0.1250	5160	220000	547	0.1250	6000	257000	⅛	0.12500	6194	264256
					522	0.0125	6020	262000												
					519		5700	243000												
5/32	574	0.0148	1300	342000					429	0.0140	1184	301000	553	0.0148	1230	296000	1/64	0.01562	1334	303550
	575	0.0275	2100	272000					428	0.0287	2405	298000	554	0.0286	2125	265000	1/32	0.03125	2547	289842
					530	0.0310	2230	255000	427	0.0423	3320	278000	555	0.0403	2790	246000	3/64	0.04687	3718	282054
					531	0.0452	3520	277000	426	0.0620	4080	268000	556	0.0645	4630	255000	1/16	0.06250	4865	276754
					532	0.0606	4430	239000	425	0.0909	6708	262000	557	0.0900	6680	248000	5/64	0.07875	7101	269314
					533	0.0909	7000	273000												
27/64	577	0.0148	2130	341000					424	0.0150	1932	305000	558	0.0174	2090	285000	1/64	0.01562	2001	303550
					529	0.0300	3680	290000	423	0.0298	3665	291000	559	0.0285	3360	279000	1/32	0.03125	3821	289842
					527	0.0448	5460	238000	422	0.0427	4930	273000	560	0.0405	6040	271000	3/64	0.04687	5578	282054
					528	0.0625	6920	262000	421	0.0652	6200	266000	561	0.0606	8780	258000	1/16	0.06250	7297	276754
													562		8720	268000				
31/128					525	0.0183	4270	271000					562	0.0154	2980	305000	1/64	0.01562	3001	303550
					524	0.0306	6140	317000					563	0.0282	5760	227000	1/32	0.03125	5732	289842
					526	0.0415	7815	297000	430	0.0434	7770	289000	564	0.0400	7700	304000	3/64	0.04687	8367	282054

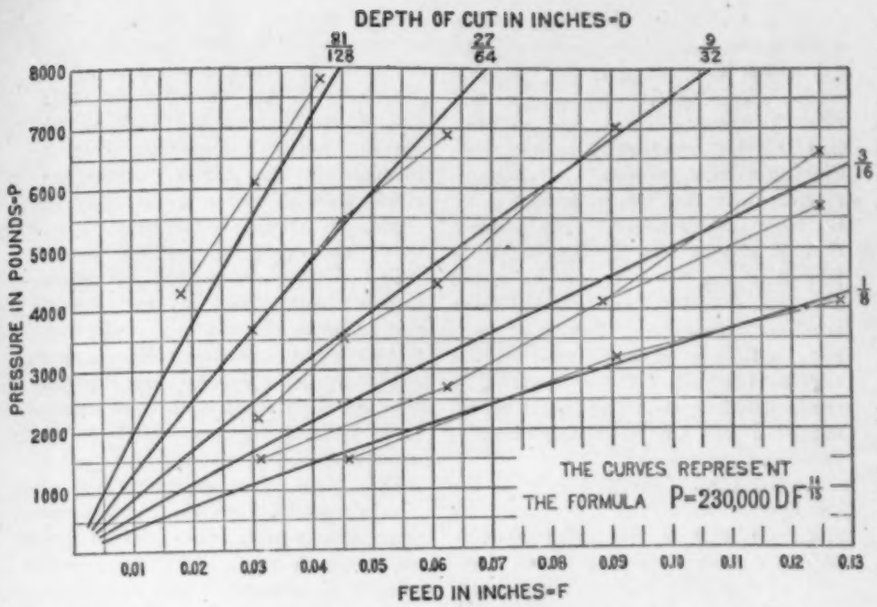


FIG. 75.—DETAILS OF EXPERIMENTS UPON THE PRESSURE OF THE CHIP ON THE TOOL IN CUTTING STEEL.

Tool used, ¾-inch standard round nose roughing tool, clearance angle six degrees, back slope eight degrees, side slope 14 degrees, shown in Fig. 23, with various feeds and depths of cut. Cutting speed about 30 feet per minute. Experiments made at shop of William Sellers & Co., Philadelphia, in 1902. For exact pressures recorded in these experiments and their equivalents in pounds per square inch of sectional area of chip see table 74.

Details of Experiments Upon the Pressure of the Chip on the Tool in Cutting Steel With Our Standard Tools.

The following are the general conclusions arrived at on this subject:

(A) The total pressure of the chip on the tool in cutting steel of the different qualities experimented upon by us varies between the low limit of 92 tons (2,000 pounds) per square inch of sectional area of the chip, and the high limit of 168 tons (2,000 pounds) per square inch sectional area of the chip. (See table 64).

(B) In cutting the same piece of steel, the pressure of the chip on the tool per square inch of sectional area of the chip grows very slightly greater as the chip becomes thinner, and is practically the same whether the cut is deep or shallow. See table 74, from which are taken the following typical cases illustrating the relative pressures of a thin feed on the one hand and a coarse feed on the other.

Depth of $\frac{3}{16}$ inch × feed 0.0156 inch: Total pressure per square inch sectional area of chip, 295,000.

Depth of cut $\frac{1}{16}$ inch × feed 0.125 inch: Total pressure per square inch sectional area of chip 257,000.

(C) The same fact mathematically expressed is that in cutting the same piece of steel, the pressure of the chip on the tool per square inch of sectional area of the chip grows greater as the thickness of the chip grows less in proportion to (thickness of the feed) $^{1}/_{15}$ or $F^{1}/_{15}$. The pressure of the chip is in direct proportion to the depth of the cut.

(D) Within the limits of cutting speed in common use, the pressure of the chip upon the tool is the same whether fast or slow cutting speeds are used.

(E) The pressure of the chip upon the tool depends but little upon the hardness or softness of the steel being cut, but increases as the quality of the steel grows finer. In other words, high grades of steel, whether soft or hard, give greater pressures on the tool than are given by inferior qualities of steel.

(F) The pressure of the chip on the tool per square inch of sectional area of the chip depends both upon the tensile strength of the chip and its percentage of stretch, and increases both as the tensile strength and stretch increase; although a higher tensile strength has more effect than a large percentage of stretch in increasing the pressure.

Referring again to table 64, upon the first, third and fourth horizontal lines of this table will be found data of three steel forgings, which are copied beneath in the order mentioned:

Tensile strength in tons (2,000 lbs.) per sq. in.	Percentage of stretch.	Pressure on the chip tons (2,000 lbs.)	Cutting speed in feet per minute.
30	29	128	111
35	30	138	64
52	14	168	41

It will be noted that the percentage of stretch of the first and second of these forgings is about the same, whereas an increase of from 30 to 35 tons in the tensile strength of the metal is accompanied by an increase of from 128 to 138 tons pressure on the chip, showing an increase in the pressure on the chip with an increase of tensile strength.

Now, on comparing the hard forging, namely, the third on the list, it will be noted that as far as fineness of quality of metal is concerned, its physical tests show it to be about equal to that of the forging on the second line. It will be noted, however, that, as before pointed out, an increase in the percentage of stretch and an increase in the tensile strength both tend toward heavier pressures per square inch of sectional area of the chip upon the tool. By comparing the forgings on the second and

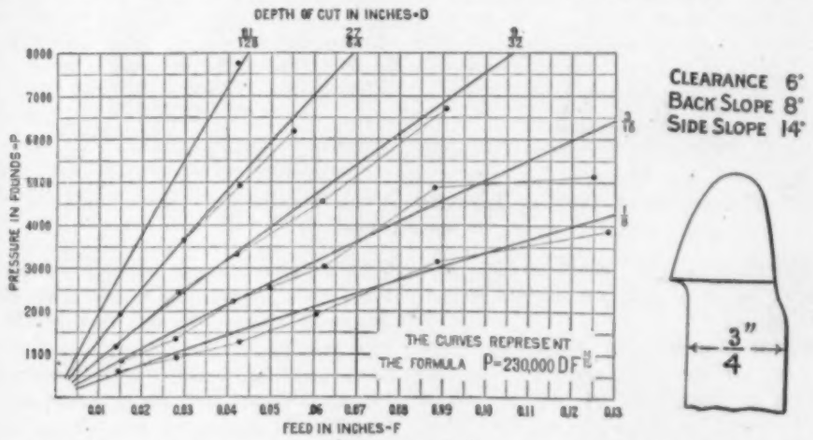


FIG. 76.—DETAILS OF EXPERIMENTS UPON THE PRESSURE OF THE CHIP ON THE TOOL IN CUTTING STEEL.

Tool used, ¾-inch round nose roughing tool, clearance angle six degrees, back slope eight degrees, side slope 14 degrees, shown in Fig. 23, with various feeds and depths of cut. Cutting speed about 60 feet per minute. Experiments made at shop of William Sellers & Co., Philadelphia, in 1902. For exact pressure recorded in these experiments and their equivalents in pounds per square inch of sectional area of the chip see table 74.

third lines, however, it will be seen that an increase from 14 per cent to 30 per cent in the stretch has less effect upon the pressure on the tool than an increase from 35 tons to 52 tons in the tensile strength; thus making it clear that an increase in tensile strength has a greater effect on the

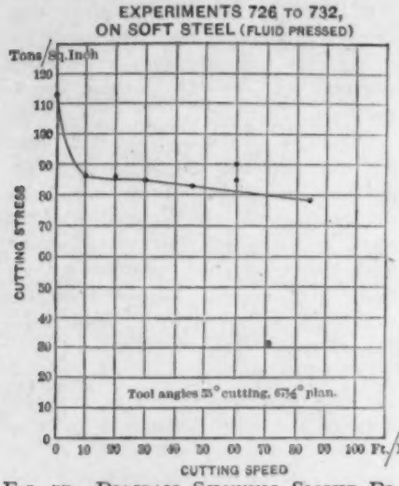


FIG. 77.—DIAGRAM SHOWING SLIGHT DIMINUTION IN PRESSURE OF THE CHIP ON THE TOOL AS CUTTING SPEED INCREASES.
Depth of cut 0.35-inch, feed ¼-inch. Same tool used for all experiments. Experiments made by Dr. Nicholson.

pressure of the chip on the tool than an increase in stretch.

Pressure of Chip on Tool the Same Whether Fast or Slow Cutting Speeds are Used.

In table 74 will be noted two sets of pressure experiments made upon steel of the same quality and with tools of the same shape, one set with cutting speeds of 30 feet per minute and another set with cutting speeds of 60 feet per minute. An inspection of the corresponding figures in these two sets of experiments and an examination of Figs. 75 and 76, in which the same data are shown graphically, will indicate that, in general, doubling the cutting speed has no appreciable effect upon the pressure of the tool. This is in substantial agreement with the results obtained in the Manchester experiments. Dr. Nicolson, in one set of dynamometer experiments, made with the same tool and the same piece of steel, obtained increasingly lower pressures on the tool for increases in the cutting speed.

In Fig. 77 we reproduce Fig. 342, taken from Dr. Nicolson's paper.[1] In these experiments a feed of ⅛ inch and a depth of cut of 0.35 inch was used. It will be observed that at normal cutting speeds there is a very slight diminution of pressures as the speed grows more rapid. In considering these experiments, however, the cut which was taken at 84 feet per minute should be left out as in this case the cutting speed was so high that the tool was ruined in one minute and twelve seconds. It is, therefore, evident that this condition is so far from that of normal daily practice that it should not be considered in formulating a law. It will be noted also that at 60 feet cutting speed there are two experiments slightly at variance with the general trend of the rest of the data. On the whole, in these experiments there is close agreement between Dr. Nicolson's observations and our own.

As heretofore stated, owing to the voluminous nature of this paper, we shall not treat of the important subject of drilling or boring metals. We would, however, refer to a very elaborate and careful series of experiments by M. Codron published in *Bulletin de La Societe D'Encouragement pour L'Industrie Nationale,* 1903, probably the most elaborate series of experiments on drilling, boring and trepanning that have yet been published. M. Codron's experiments cover the pressures required to cut not only steels of various hardnesses, but also cast iron, bronze and other metals, and are made on almost all points with the thoroughness characterizing the work of all of our best modern French scientists.

Power Required to Feed the Tool.

By far the most important conclusion arrived at by us in the field of "Pressure of the Chip on the Tool" is that the gearing designed in lathes, boring mills, etc., for feeding the tool should be sufficiently strong to deliver at the nose of the tool a feeding pressure equal to the entire driving pressure of the chip upon the lip surface of the tool. This fact was developed by us in an experiment made in the year 1883 in the works of the Midvale Steel Co., and had such an important bearing upon the cost of turning out the product in the machine shop of those works that the results of this one simple investigation more than paid for all the experiments in the entire field of cutting metals undertaken in the Midvale Steel Works.

All the lathes, boring mills, etc., purchased by this company from that time forward were fitted with feed gearing designed with power equal to the driving power of the machine, and in this way the many stoppages and delays so common in the average machine shop, due to broken feed gearing, were avoided. What is of much greater importance, a lack of strength in the feed gearing never was accepted as an excuse on the part of any machinist for not taking the maximum cut on his machine.

When, fifteen years later, the writer started to reorganize the management of the Bethlehem Steel Co. (a company in direct competition with the Midvale Steel Works and turning out a similar product), he was astounded to find that some of the leading tool builders of the United States who had been supplying extra strong feed motions with the machine tools furnished during this term of years to the Midvale company, were selling machines fitted with far weaker feed gearing to the Bethlehem company. On inquiring into the reason for this, he has informed that these tool builders had not even told the Bethlehem company of the existence of lathes designed with extra heavy gearing, their reason being that they were certain that the

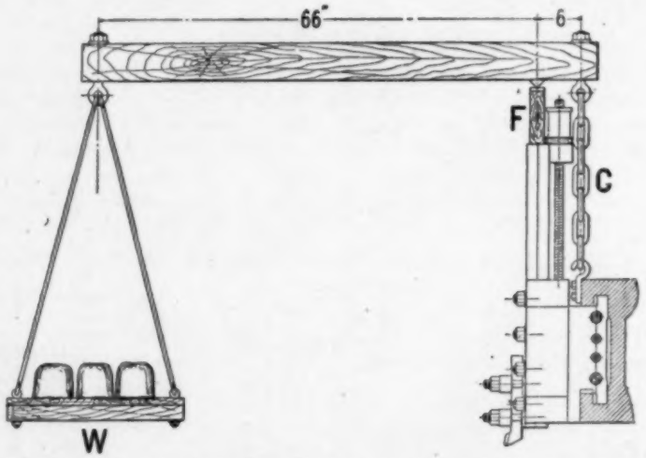


FIG. 78.—APPARATUS USED IN EXPERIMENTS FOR MEASURING PRESSURE REQUIRED TO FEED A TOOL.

[1]Trans. A. S. M. E. XXV page 675.

Bethlehem company would not be willing to pay any extra price for the more powerful feed gearing and it would only make them dissatisfied if they knew that they were not getting the most powerful machine built. The introduction of "task management" into the Bethlehem Steel Co., however, promptly developed the weakness in this particular of most of the machine tools in their shop.

In justice to one of the greatest engineers in this country, it should be said that all of the special machines designed under the supervision of Mr. John Fritz for the Bethlehem Steel Co. were provided with feeding mechanism of ample power. The writer does not recall a single instance in which the feed motions of any of Mr. Fritz's machines broke when they were used to their maximum capacity under task management.

Apparatus for Determining the Power Required to Feed a Tool

The following very simple apparatus was used in 1883 in our experiments upon the power required to feed the tool. In Fig. 78 will be seen a view of the vertical slide of a Wm. Sellers & Co. 84-inch diameter vertical boring mill. Upon the top surface of this vertical slide a wooden lever was made to bear upon a knife edge, the short end of the lever being held down by a chain connected with an I-bolt, and at the long end of the lever a receptacle was suspended into which weights were added until the required feeding force was obtained. The vertical slide was at first fed by means of its usual feeding screw. A loose washer, however, was fitted beneath the nut of this screw, and this was, of course, kept tight while the operation of feeding was performed with the regular feed gearing, and weights were added on the end of the wooden lever until the feeding was done by means of the lever instead of by the regular feed mechanism. The point at which this transfer of the feed took place was determined by finding when the washer just became loose. This was found to be quite a sensitive indication of the power required to feed. The experiments were made upon a locomotive tire, the metal of which was about carbon 0.56 per cent, manganese 0.68 per cent, tensile strength 124,000 pounds, and 12 per cent to 14 per cent of stretch.

Tools with cutting edges varying from a straight edge at right angles to the direction of the feed to our standard round nosed tools, approximately, as illustrated in Fig. 21, were used, with a depth of cut varying from 1-16 inch to ¼ inch, and the thickness of the feed varying from 0.0243 inch to 0.0774 inch. The pressure required to feed a square nosed tool was somewhat lighter than that required to feed our standard round nosed tool, and under average conditions as to the dullness of the tool, after eliminating the friction of the slide to which the tool was attached, the pressure upon the lip surface of the tool was found to be about 2.2 times the power required to feed the tool.

It should be noted, however, that the words "tool of average dullness" have a different meaning in our case from the same term as applied to tools in the average machine shop, since it was our regular practice to use tools much duller on the average than those in common use in other shops. We ran at such relatively high cutting speeds that the cutting edges of our tools were soon rounded over, and this undoubtedly produced higher feeding pressures than would be required for the ordinary sharp lathe tool.

However, before finishing our experiments it occurred to us that the normal power required to feed the tool was not the figure which should be used in designing machine tools, but that the maximum power which would ever be likely to be called for in feeding the tool was the only one to be used practically. This led to an experiment in which an exceedingly dull tool was used, such a tool as would only be allowed by a very careless machinist to continue under cut, but which condition was sooner or later sure to arise in the case of every machine tool throughout the shop.

The use just once of a scandalously dull tool in a machine would, of course, suffice to smash the feed gearing. An experiment made with a tool of this kind demonstrated the fact that to insure against breakage sufficient strength was called for in the feed gears to deliver at the nose of the tool a pressure equal to the total driving pressure of the chip upon the tool. This one almost brutal experiment rendered all our more careful and accurate experiments of merely trifling interest.

When in 1904 the thoroughly scientific work of Dr. Nicolson in this field with his lathe tool dynamometer was published, it was with no little interest that we read his paper, feeling that in the end he was doomed to the same disappointment as to much of the scientific value of his work as we had experienced from ours. Unfortunately, however, Dr. Nicolson's experiments were not extended to a scandalously dull tool, and for that reason readers of his paper must be warned against the adoption in tool design of the figures on feeding (or "traversing") pressure obtained by him. We do not, of course, state that the data in Dr. Nicolson's paper were not of great scientific interest, but merely that for the one perhaps most important purpose for which the experiments were undertaken his data should be disregarded.

(To be Continued.)

MILLIONS IN BRIDGES.

The New York Interstate Bridge Commission, consisting of three members appointed by the governor of New York and three by the governor of New Jersey, has presented a report to the legislature of the former state declaring that the construction of one or more bridges across the Hudson River between New York and New Jersey is feasible from an engineering standpoint. A location somewhere between Fourteenth and Seventy-second streets is recommended and the estimates of cost range from $25,000,000 to $33,000,000. Comptroller Metz reports that total expenditures up to date on the Manhattan bridge have been $6,349,255, and expresses the opinion that the bridge may be completed within three years. The original estimated cost was $15,833,600 and the first contracts were let in May, 1901. The Ryan-Parker Construction Co. has the contract for the superstructure, and it is estimated that over 40,000 tons of steel will be required. Already fears are expressed that the Manhattan bridge will be able to relieve the congestion of traffic for only a short time and it is predicted that within four years after it is completed conditions will be as bad as ever. Bridge Commission Stevenson has asked for an appropriation of $25,000 to cover the cost of preparing plans for another bridge.

Magazines in Canada.—*Canadian Machinery*, a leading trade journal of Canada, publishes a vigorous editorial stating that, in spite of rumors to the contrary, there is no organized movement on the part of publishers in that country to prevent United States magazines from circulating in King Edward's American possessions. "We are," says *Canadian Machinery*, "very much opposed to any movement reacting against the best publications in the United States, believing that Canadians should have the most liberal access to the best reading possible." The post convention between the United States and Canada, in so far as it relates to second class matter will be abrogated next spring. *Canadian Machinery* states that it has reason to believe that this action was taken upon the suggestion of a high official of the United States post office department in order to assist the United States authorities in some scheme which has not yet been made public.

Charles M. Gardiner, Clifford D. Drabble, Wm. A. Paberson and others have incorporated the Crescent Machine Co., Ltd., Montreal, with $20,000 capital.

A NEW LINE OF CONTROLLERS.

The Electric Controller & Supply Co., Cleveland, is placing upon the market a new line of controllers termed type G which have a rating of one to 50 horsepower. These controllers were built to meet the requirements of general crane service where the conditions are not severe enough to demand the use of the Dinkey ventilated controller. The type G-3 and G-4 controllers are built with coil resistance and the type G-5 and G-6 controllers are built with cast grid resistance. When it is desired to place controllers above or in the rear of the operator the type G controller is furnished arranged for under lever operation. They are also furnished with spring return for operation from the floor by means of pendant ropes or chains. A number of crane users have decided that a 15 or 20-ton crane requiring a 25 or 30-horsepower motor on the hoist and bridge motion may be operated from the floor by any of the men in the shop, thus saving the wages of a crane operator, who would probably be idle half of his time. It is a very simple matter to put cutouts at either end of the trolley travel and at either end of the runway to prevent accident.

The type G controller meets this demand for a controller up to 50 horsepower arranged for operation from the floor by means of ropes. This controller is a self-contained unit, the resistance being placed in the frame, making it necessary to run only four wires between the controller and motor. Reversal is accomplished by the use of a single lever, no separate reverse switch being required.

All parts are made to jigs and are interchangeable. The contact face is of heavy slate free from metallic veins. The contact segments are of copper, which are screwed to brass lugs to which all wiring connections are made. By this construction any of the contact segments can be removed and replaced without disturbing the wiring connections. The contact arm is of soft cast iron and carries the fingers and finger holders, the insulation of which is of heavy pressed vulcabeston bushings. The contact fingers are drop forged copper of great hardness and may be removed and replaced without removing the contact arm. A powerful and effective blow-out is provided in all sizes of these controllers.

The frame for type G-3 and G-5 controllers consists of a main casting in one piece provided with a cover, the removal of which affords easy access to all resistance connections. The case enclosing this frame is of perforated steel, thus allowing ample ventilation. The frame of the G-4 and G-6 controllers consists of a bottom casting which supports the resistance, and a top casting which supports the contact slate and arm. The top and bottom castings are connected by means of four steel corner posts, around which a casing of perforated steel is provided for ventilation and protection to the resistance. The top casting of the G-4 and G-6 controllers supports the contact slate which is completely covered and protected by a sheet steel casing. This protects the operator from coming in contact with any live parts of the controller, and also protects the working parts of the controller from dust and dirt.

Easy operation is secured by a lever which is keyed to the arm shaft at the back of the top casting, which gives a movement of about 10 inches in either direction for both starting and reversing. The resistance for the G-5 controller is built of cast girds in a single bank which may easily be removed as a unit without disturbing the other parts or moving the controller. The resistance for the G-6 controller is made of two banks supported on bars attached to the frame, and may be removed in separate units without disturbing the other parts. The resistance for the G-3 and G-4 controllers is made up of coils, which consist of a heavy asbestos tube stiffened by means of a central brass tube which serves to bring the rear terminal forward, facilitating the necessary connections. These controllers are adapted to service up to 500 volts. Six points of control are provided with the G-3 and G-5 controllers, and eight points of control with the G-4 and G-6 controllers.

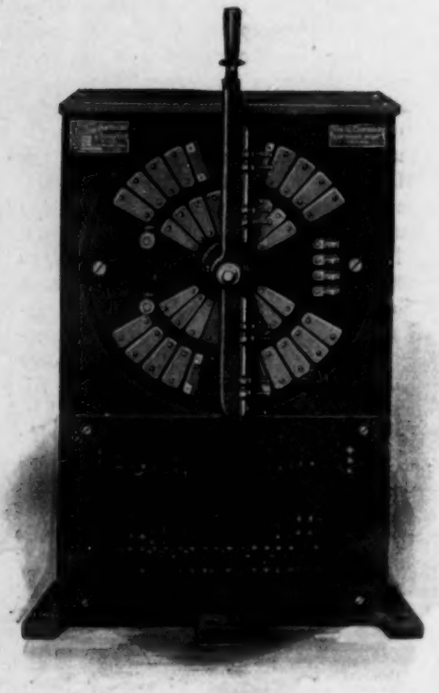


FIG. 1.—FRONT VIEW, TYPE G-5 CONTROLLER CAST IRON RESISTANCE.

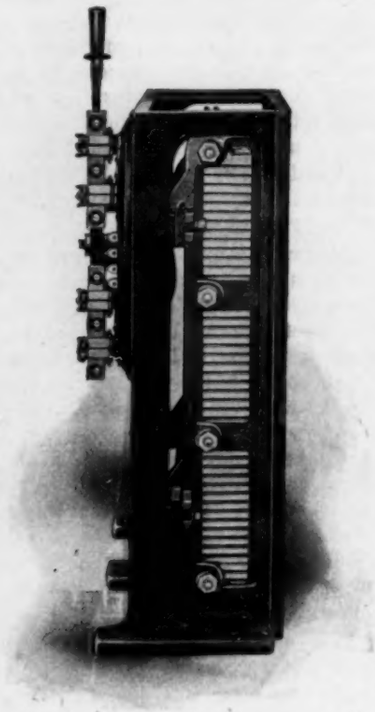


FIG. 2.—SIDE VIEW, TYPE G-5 CONTROLLER, CAST IRON RESISTANCE.

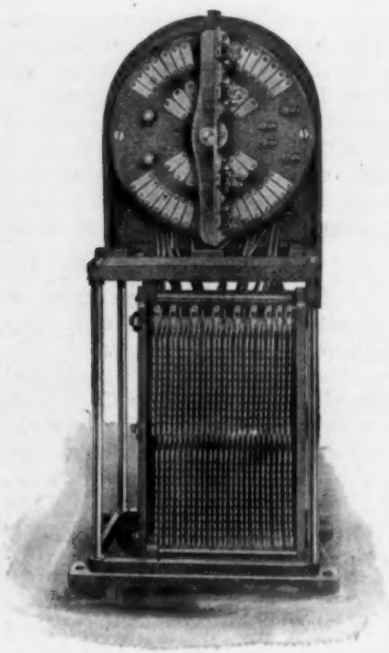


FIG. 3.—FRONT VIEW, TYPE G-6 CONTROLLER, CAST IRON RESISTANCE.

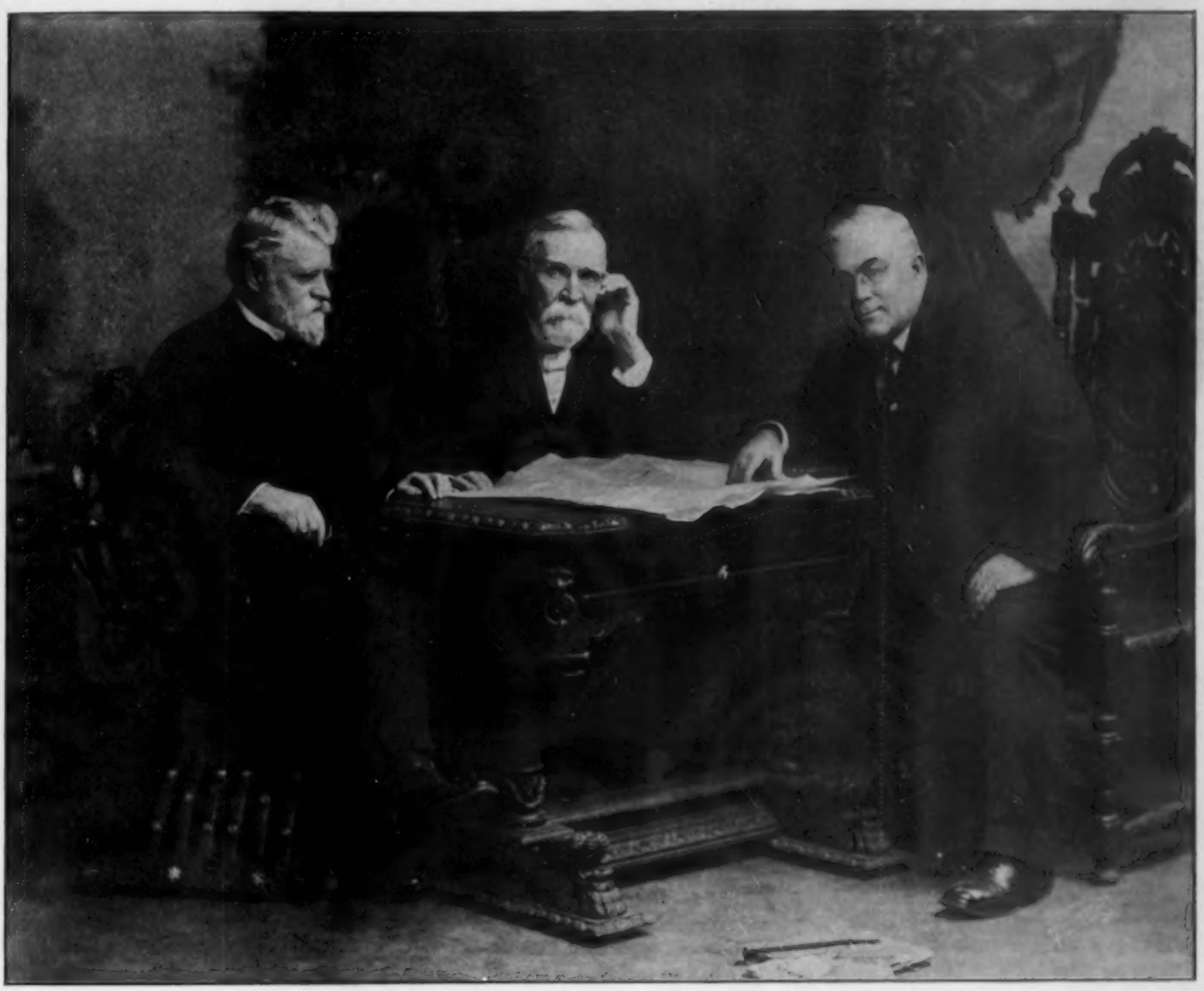
EMINENT MEN OF THE IRON WORLD

1. JOHN FRITZ

By B. S. Stephenson.

In the quaint, quiet, little town of Bethlehem, Pa., where for a third of a century he labored unceasingly in solving the tangled problems of iron and steel making, John Fritz is rounding out a life that has been beset with difficulties, crowded with achievements of lasting worth and crowned with honors such as have come to few Americans. Though he has passed by a decade and a half the allotted three score years and ten, the innate energy of the man will not permit his complete retirement and a considerable part of every day is spent at his desk, caring for the mass of consulting work which pours in to him unsolicited. The warm grasp of his great hand has lost something of its accustomed firmness and his step has grown slower, but the vigor of his splendid mind is unimpaired. He finds pleasure in the well selected books which crowd his library and in the visits of countless friends; he is a follower of political affairs, numbering many close acquaintances among those high in official life of his state and republic; he has kept pace with the industry to which he has given all his energies, and his eyes light up with the fire of old-time enthusiasm as he talks of the days when he was actively and intimately associated with the launching and development of steel manufacture on this side of the Atlantic.

The picture which John Fritz presents today is an index to his life. The strong, kindly face, the snowy beard and hair, the deep, clear, expressive eyes are those of a man who has lived long, worked hard and wrought much; who has shouldered vast responsibilities, overcome tremendous obstacles, labored and planned and conquered in untried fields; who has had lasting faith in men and



The Most Recent Photograph of John Fritz.

This picture was taken during the winter at the Falk Studio, New York. Mr. Fritz is in the middle, with Ambrose Swasey and S. T. Wellman of Cleveland, both old friends of the steel-maker, on the left and right, respectively. The three are past presidents of the American Society of Mechanical Engineers.

has never swerved from the standard of right.

Mr. Fritz at Home.

As he sits in the library of his spacious home, the striking feature is his eyes, keen, bright, trusting yet firm, gentle yet commanding, able to read a man at a glance and by that same glance to enroll him as a friend. When he rises, one is impressed by the stature of the man, his broad shoulders and his sturdy figure. In his handshake and kindly smile of greeting there is something magnetic. One who has known him intimately said recently. "John Fritz is truly a great engineer—great as an engineer of machinery, but greater still as an engineer of men." And it is characteristic of him that among his most frequent and welcome guests are the few remaining of those who years ago la-

THE FRITZ MEDAL—OBVERSE SIDE.

bored with him as workmen at the Bethlehem plant.

The outlines of the career of John Fritz are quickly told, as practically the whole of his active life has been devoted to the building up of two great works, those of the Cambria Iron Co. at Johnstown, Pa., and the Bethlehem Iron Co. at Bethlehem. He is a native Pennsylvanian, having been born in Londonderry township, Chester county, in 1822. The routine duties of the boy on the farm gave him but little opportunity for laying the foundations of an education, but with his brother George, with whom he was later to be associated in the Cambria works, he attended a country log schoolhouse.

Early Days on the Farm.

"School was kept for three months in the winter of each year," he says, explaining this period of his career. "We had to take care of the stock on the farm in the morning before going and in the evening after we returned, and a great deal of the time we had to walk over two miles to the school. This was in the days when you paid the teacher, if I remember rightly, two and a half cents per day, and the teachers generally boarded around among the farmers. The books used in the school that I attended included Bennett's arithmetic. In those days it was considered pretty tough and was shunned by most of the boys, but on that account I accepted it, as I thought there was not much merit in doing what everybody else could do."

At the age of sixteen the boy Fritz entered a machine shop at Parkersburg, Pa., where he served his apprenticeship, on the completion of which he entered blast furnace work, being connected with the building of several early day furnaces. In 1846 he went to the Norristown Iron Works at Norristown, Pa., being in charge of that plant until about 1850, when he removed to Safe Harbor, Pa., to engage in mechanical engineering work. Four years later he located in Johnstown, where as chief engineer and general superintendent he rebuilt the Cambria Iron Works.

This, as he says, was before the days of the "sticklers for titles," and though he was only thirty-two when he assumed charge of the works, he was familiarly termed "the old man." In spite of his youth, some of the best work of his life was done at Cambria, the innovations there installed by his brother and himself practically revolutionizing the rolling mill practice of the times. These included the three-high blooming mills with automatic tables and the three-high rolling mills, besides the development of the feed tables to a practical basis, all of which brought the plant into wide prominence. Some of the obstacles which were overcome in carrying out these projects are referred to in a letter written some years ago by Mr. Fritz to the editor of THE IRON TRADE REVIEW.

Ante-Bellum Conditions.

"In order to fully appreciate the difficulties that had to be encountered," he wrote, "you will have to go back to about the years 1854 to 1857 and learn the conditions of the rolling mills at that time and the then existing prejudices against any improvements. When I first suggested the improvements at Cambria, which were afterwards made, I was considered a visionary schemer—just the man to ruin any company which would give him the opportunity to do so. This fight I had to make alone, as the proprietors, foremen and workmen had but little, if any, faith in what I then proposed to do, and they all had to be educated up to it. This was a very difficult task, as they were very generally impelled by prejudices, which are much more difficult to change than honest convictions."

When the improvements at Johnstown were completed and in eminently satisfactory operation, Mr. Fritz removed to Bethlehem, leaving the Cambria works in charge of his brother. Under the latter's supervision the first steel rails were rolled in the United States, from ingots cast at the Pennsylvania Steel Works at Harrisburg. This and other accomplishments of the brother were a source of great pride to Mr. Fritz, who believes that, "but for his untimely death, George would have ranked as one of our ablest engineers."

Making Structural Shapes.

It was in 1860 that John Fritz was called to take charge of the erection of the Bethlehem Iron Co.'s works. He found the little Moravian settlement in the narrow valley operating a few small open top furnaces, out of which he developed a unique iron-making district. After launching the manufacture of billets and steel rails at the plant, he turned to the production of structural shapes of a design better suited for fabrication than had been rolled previously,

THE FRITZ MEDAL—REVERSE SIDE.

and the output of this mill found speedy favor; then he began the manufacture of heavy shafting, for use on side-wheel steamboats and similar purposes, and of heavy forgings, which up to that time had been made outside the country. In connection with this work, he constructed the famous 125-ton steam hammer, the largest ever constructed, and the story of the methods employed to secure for it a steady foundation in the swamp land on which the plant was located is unique in engineering. The Bethlehem works were erected on a conservative basis, its cupola was restricted and for the sake of economy a great part of its machinery was built at the works from designs prepared by Mr. Fritz.

How well this work was done is attested by the high reputation which the Bethlehem products speedily won. It was an axiom with John Fritz that the best possible product was the only kind worth turning out. He let it be known about the plant that his attention was to be called to any defect in a piece of steel, and this with him was always ample ground for its prompt rejection, though it often cost the company dearly. Purchasers frequently had inspectors sta-

tioned at the plant to see that shipments contained only materials up to the standard, but the workmen regarded this as a mere waste of money.

"If it's good enough for Uncle John," said one of them, "it's good enough for any of those inspector fellows."

One of the traits contributing in great measure to the success of Mr. Fritz was his ability to read the signs of the times in the industry and estimate conditions far in advance. When the richness of the Lake Superior ore ranges had been established beyond a doubt, and the Pittsburg district, working on the cream of these Bessemer ores, began to forge ahead in the making of rails, he understood that eastern Pennsylvania, with the best of its Bessemer ores already utilized, must turn to other channels for profitable operations.

Photo by Conradi, Bethlehem. THE FRITZ HOME, BETHLEHEM, PA.

Armor Plate Experience.

The Civil War had directed attention to the use and possibilities of armor plate and its manufacture had been taken up abroad with some degree of success. The field appealed to him as one which might prove the salvation of the Bethlehem plant and he turned to the complex problems which its production involved. There was little of an established basis on which to begin his work; experience had pointed out numerous methods which it would be well to avoid, but there were few practical results to guide his experiments. But the plant was built at Bethlehem, the first plates were turned out and at the government proving grounds, preparations were made for a test. Army and navy officers were dubious of the single steel plate, but Mr. Fritz had made it because he believed it alone could stop the steel tipped projectile hurled against it and still retain its shape without cracking. What he most feared was that the compound plate of a rival concern, constructed on different lines, "might accidentally happen to be a good one" and also stand the test. The day of the trial was an anxious one for him, as he waited at Bethlehem for word of the outcome. He expected a message at noon, but 1 o'clock, 2 o'clock, 3, 4, 6 o'clock passed with no dispatch. Finally in the evening the belated telegram came. Mrs. Fritz tore it open and read:

"Compound plate knocked to smithereens. Bethlehem plate stood the test."

His judgment was vindicated and the future of the great armor plate plant, in which over a million dollars had been invested, was secure.

Mr. Fritz remained in active charge at Bethlehem until 1893, his term of active service there being exactly a third of a century. Much of the time he was on duty 16 and 18 hours out of every 24. As the fruit of his labors he left to the company a splendid plant in successful operation; to the steel making industry he left devices and processes which have played a foremost part in its advancement. A small army of younger men trained under the supervision are today prominent in every field of steel making.

Valued Friendships.

Duly proud though he is of what he has accomplished, and still more proud of the associates of his life, John Fritz is thoroughly simple, modest and unassuming. It has been his fortune to be widely and intimately acquainted with men of prominence in engineering and official lines, yet his pleasure in these friendships was because they were with men of sterling worth, not because they were with men whom the public called "famous." Twice the engineering and industrial leaders of the nation gathered to honor birthdays of Mr. Fritz. On both

occasions his consent to the holding of these affairs was given most reluctantly, in the first instance only in response to the plea that it would please his friends. The guest list doubtless contained more names of prominence in the industry than had ever been gathered before. Kings of iron and steel, educational leaders, army and navy officials, technical men in every branch of the profession were there, and at the personal request of Mr. Fritz himself about a score of the machinists and mill hands who had worked under him at Bethlehem.

"There isn't another industry anywhere which has produced so many strong, fine men as iron and steel making has," said Mr. Fritz recently to the writer, motioning as evidence to the row of splendid portraits which line one of the walls of his library. And the evidence was conclusive, for the list included such men as Alexander Holley, "Captain Bill" Jones and Sir I. Lowthian Bell. The opposite wall is covered with evidences of his many honors. There is the framed notification of his election to the exclusive honorary membership in the British Iron and Steel Institute. Near it is the award of the Bessemer medal, with a replica of the prized token itself.

Highly Prized Resolutions.

"Those are greater honors, I suppose," said Mr. Fritz. "But, do you know, I think a great deal more of those resolutions which the engineers gave me?" He pointed to the engraved message of greeting and appreciation sent him by the American Society of Mechanical Engineers a few years ago.

"All those who signed that are my friends, and my peers," he explained, as he deciphered the signatures attached. And there was a note of pathos in his voice as in many cases he followed the name with "He's gone now." Out in the hall is the great chiming clock, a gift to the home by those banqueting him on his seventieth birthday. It is inscribed:

"O Time! deal gently with our loving friends, John B. and Ellen Fritz."

Time has dealt gently with them, but not with many of the friends who gave it, and the closest associates of his most active years have largely passed away.

"When I'm through with it," said Mr. Fritz, with a glance of affection at the beautiful clock, "It's going back to the engineers." And the time-piece could have no final resting place nearer to the heart of Mr. Fritz, who has always been intimately associated with the various engineering societies. He was made a member of the American Institute of Mining Engineers the year following its organization and was president in 1894. The American Society of Mechanical Engineers elected him to membership in 1881 and to the presidency in 1895. The American Society of Civil Engineers made him a member in 1893 and six years later elected him to honorary membership. He has watched with keenest interest the erection of the Engineering Building in New York and is a frequent visitor there.

A Memorable Banquet.

Mr. Fritz is now almost 85 years of age. His eightieth birthday was celebrated both by the holding of a largely attended banquet at the Waldorf-Astoria and by the founding of the John Fritz medal and its first award to the noted steel-maker. About 500 men prominent in the manufacture of iron and steel and in the engineering profession, by popular subscription, raised a sum sufficient to cover the expenses of designing the original medal and preparing a handsome album containing the signatures of those participating in the movement, besides setting aside about $4,000 as a permanent fund from the proceeds of which later medals should be provided. It was arranged that the medal should be awarded "for notable scientific or industrial achievement" and that there should be no restriction "on account of nationality or sex." It was further provided that the award should be made not oftener than annually, by a board of 16 chosen from the membership of the civil, mining, mechanical and electrical societies."

The banquet at which the initial award was made is historic in the annals of the industry. Col. Henry G. Prout served as toastmaster, and the medal was presented by John Thompson, an old friend of the recipient. The gathering, like that at Bethlehem 10 years earlier, was a large and distinguished one. Messages of greeting poured in from both sides of the Atlantic and a long toast list included Rear Admiral Melville for the navy, General Eugene Griffin for the army, George S. Morison for the civil engineers, Dr. R. W. Raymond for the mining engineers, Captain Robert W. Hunt, a life-long associate, for the mechanical engineers, Oliver Williams for the neighbors in the Lehigh Valley, Professor Elihu Thompson for the electrical engineers, and Daniel A. Thompkins, "one of John Fritz's old boys," who is to have the distinction of being his biographer.

Improvements in Methods.

During the long term of his active career, Mr. Fritz has witnessed the advance of the United States from the position of a comparatively unimportant smelter to the leadership of the world in the manufacture of iron, steel and their products. He has seen the revolution of blast furnace and steel mill practice. In an engineering capacity he has served father, son and grandson and has watched the gradual supplanting of individual and family ownership by the corporation. He played his intimate part in the upbuilding of eastern Pennsylvania, only to see the center of steel production shift to the westward, under the magnetic attraction of the ore supply. But he is of the opinion that this tendency is not to continue uninterruptedly.

"Some day," he said recently, "the east is again to become a great iron and steel district," for he has faith in the extensive ore resources of New York, New Jersey and Cuba and in the perfection of the concentration and roasting processes.

This unusual prediction gains weight when consideration is given to the accuracy with which he has forecasted other industrial movements. Twenty years ago he expressed the view that the Bessemer process in America was gradually to decline and that the basic open hearth process would eventually become supreme. The latter was then an insignificant factor in steel production, but the tendency of the present is unmistakably as he predicted.

As has been the fate, or fortune, of few men, John Fritz has lingered to see the full recognition of his life work. Medals and memorials have been his almost without number, interviewers have sought him and gifted speakers have voiced their appreciation of his worth. But a greater tribute than any of these was paid him many years ago when the then secretary of the navy, introducing him to a committee of congress which was wrestling with the armor plate problem, said:

"I present to you John Fritz of Bethlehem, the most honest man I have ever known."

Canadian Pig Iron Statistics.

The following table, compiled by the American Iron and Steel Association, gives the total production of all kinds of pig iron (including spiegeleisen and ferro-manganese) in Canada from 1894 to 1906:

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1894..	44,791	1899..	94,077	1904..	270,942
1895..	37,829	1900..	86,090	1905..	468,003
1896..	60,030	1901..	244,976	1906..	541,957
1897..	53,796	1902..	319,557	.....	.....
1898..	68,755	1903..	265,418	.....	.....

During the first half of 1906 Canada had 13 completed furnaces in blast and during the last half it also had 13 furnaces in blast. In the first half of 1905 it had 13 furnaces in blast, and during the last half of the year 12 furnaces. It will be observed that in the two years from 1904 to 1906 the production of pig iron in Canada more than doubled.

The Acme Wire Co., of Cuyahoga Falls, O., has been placed in charge of L. D. Brown of Akron, as receiver, by the appointment of Judge Taylor in the United States district court in Cleveland.

BUSINESS IS KING

And the World is Getting Better.—Fundamental Law of Success.

The New York Traffic Club held a banquet at the Waldorf-Astoria, New York, Feb. 16. One of the speakers was John A. Walker, vice president of the Joseph Dixon Crucible Co., who spoke on "The Shipper's View" as follows:

"We are living now in the best days the world has ever seen—what might be called the halcyon days; in other words, the golden days referred to by the writers of the past, the days that the prophets looked forward to with wistful eyes. Not only this, but we happen also to live, as far as the bulk of the people are concerned, in the best land in the world, the best country that the sun shines upon. Still out of the past, the most prominent and the most pathetic figure that appears, is the specter of poverty. The human race has had more or less a hard time of it, coming up from its brute inheritance. Men have been largely hungry, largely ragged, and largely houseless, and until recently, the conditions have not very much bettered.

"Way back in the past the management was military. The soldier was the great man. The conqueror was the leading spirit. All the talented people became soldiers and conquerors, and ruled the world under a military system, and still men stayed hungry, and ragged and houseless. Then the sway passed to the priesthood. The priests obtained and kept power, because they had all the knowledge there was, and in this way they kept their grip on human affairs; still men stayed hungry, and stayed ragged and stayed houseless.

"Then came the period of the lawyer statesman, and the lawyer was the prominent man. The talented young men all drifted to becoming lawyers. Still men stayed hungry, and ragged and houseless.

The Business System.

Later, and almost insensibly, came the change to a business system, the present system under which we now live. The conqueror, soldier, priest, the statesman lawyer pass to the rear, and the business captain comes to the front. King Edward, of England, is a business man. Emperor William of Germany is preeminently a business man. The late Russian-Japan war was a business war, Russia wanting a business foothold on the Pacific, and Japan preventing it. The able young men are all flocking to the business standard. They equip in law to be useful to a big industry. They equip in engineering to join some big traffic system. The great men of the day are business men; people most in the public eye are important business men. Now for the first time comes light on the economic problem, and more progress has been made in individual well-being in the last half century, under the business regime, than in all the centuries together under the conqueror, priest, and lawyer. Now wealth begins to multiply. It is true the rich become richer, but the poor begin to share the riches, and the poverty specter is dwindling away. For the first time the hungry are not now so hungry, and the ragged are better clothed, and the poor man lives in a better house.

"As an illustration of how this comes about, it can be mentioned, by the way, that the town of Lowell, Mass., is a center of busy workers, a bee-hive of industry, and a man in Lowell gets his year's supply of bread and meat from the west, where it is produced, and under the present business regime, what he will use in a year will cost him for the freight thereon, from the west, not more than a day's wages. The beginning of the industrial end has arrived, and the real end will be that everyone will be well fed, and well clothed, and well housed. Then on this basis, the arts and spiritual life can better thrive.

Some Striking Figures.

"In this business empire, the traffic system has huge proportions. Look at some of the data:

The mileage is 230,000 miles.

The capitalization is sixteen billion.

The gross earnings are two and a half billion.

The net earnings are one billion.

The traffic is 2,000 tons per annum per capita.

There is a mile of railway track for every 400 people.

"With its 30,000 or 40,000 locomotives, and ratio of one horsepower to six men, this is equivalent to an addition of 200 million workers to the population. From the beginning men have obtained wares from strangers, and this means trade. Trade means roads, and roads are indispensable to trade. Whoever controls the roads controls trade. James J. Hill created a new northwest, Spencer of the Southern road created a new south, Cassatt and the early Vanderbilts brought cheap bread and meat from the west to the east. All this has been done economically.

"In the last half dozen years, railway passenger rates have increased a trifle over 1 per cent and freight rates have increased a trifle over 5 per cent, while during the same time metals have increased in price 42 per cent, lumber has increased 14 per cent, clothing has increased in price 10 per cent and the average of all stuffs has increased in price 11 per cent.

The Shipper's Duty.

"With this magnificent traffic fabric, has grown up the shipper, whose view I voice. The shipper now numbers a million four hundred thousand business people, of whom 400 are the gigantic so-called trusts, and to my mind, the shipper's point of view is that he should stand side by side with the traffic men. The shipper frowns on government ownership; the shipper has seen this stupendous system rise and consolidated without outside help, and without favor, he has seen it work its way as a mighty illustration of business evolution, and the shipper thinks it should continue on the same lines that it has so magnificently developed, and to the end with a minimum of government control. The shipper looks down the future, and sees glorious days to come, days when surely the poverty specter will be exorcised in toto, when human ability shall be indefinitely improved, and instead of fighting the traffic man, the shipper will be proud to stand with him, as the twin representative of the great business regime that will sooner or later bring in the true millennium.

"The fundamental law of this success was propounded by our Lord and Savior Jesus Christ, who when they came to him and foolishly asked which of these two men shall be the greatest in the Kingdom of Heaven, said, with good religion and with even better economics, that he of the two that sinks most emphatically his own personal selfish ambitions and does the most unselfish work for the public welfare, will be the important man anywhere and everywhere."

Iron Men Interested.—Announcement has been made of the organization of the National Copper Bank, which is to open for business about May 1 at 115 Broadway, New York. The institution will start with a capital of $2,000,000 and a surplus of like amount, fully paid up. Among the applicants for the charter are: John D. Ryan, president of the Anaconda Copper Co., and managing director of the Amalgamated Copper Co.; Thomas F. Coe, president of the Oliver Iron Mining Co.; and William B. Dickson, second vice president of the United States Steel Corporation.

Germany's Machine Exports.—A decrease in exports of 16 per cent in quantity and 15 per cent in value was shown by Germany machine exports for 1906. The export of machinery for flouring mills, distilleries and breweries shows a slight increase over that of 1905. In other cases the reverse is the rule, and it is most strongly marked in steam engines. The flourishing state of the machine industry in Germany, however, states Counsul Thomas H. Norton of Chemnitz, shows clearly that in the Empire, as in the United States, the demands of the home market are increasing in an unusually rapid ratio.

COKE PRODUCTION

And Prices During the Past Twenty-Seven Years.

The Connellsville coke region during 1906 showed the greatest production in its history. As stated in the IRON TRADE REVIEW of Feb. 14, the total tonnage was close to the 20,000,000-ton mark, and the total valuation of the production, based on the average price during the year was $54,998,146, or an increase of $14,500,000 over the previous year, according to the *Connellsville Courier*.

As forecasted in these columns two weeks ago, the total new ovens either actually under construction, or contemplated during the coming year, is close to 7,000, and the increase in 1906 over 1905 was nearly 3,000. The available coking coal land in the regions proper is becoming more limited each year and with the exception of a few reservations or "stumps" practically all mining rights in the old region have been taken, although there is no likelihood of a near-by exhaustion, this simply being the natural growth. New operations will in the future be largely in the new fields of Green county, and during 1906 and early 1907 several large sales of acreage have been made to interests unable to secure property or mining rights in the old region.

The total number of cars shipped from the Connellsville region in 1906 was 533,259, or 14,399,437 tons. The Lower Connellsville region shipped 212,015 cars or 5,599,889 tons.

The following table shows the number of cars and tonnage per month shipped from the Connellsville region and Lower Connellsville region, respectively, in 1906:

Connellsville Region.

Month.	Cars.	Tons.
January	45,712	1,234,503
February	38,946	1,052,854
March	45,706	1,233,843
April	43,811	1,182,589
May	47,398	1,278,274
June	44,664	1,205,419
July	44,573	1,203,779
August	44,634	1,202,962
September	42,164	1,137,333
October	48,510	1,310,267
November	44,917	1,213,464
December	42,224	1,144,150
Total	533,259	14,399,437

Lower Connellsville Region.

Month.	Cars.	Tons.
January	16,337	431,244
February	14,452	382,598
March	16,988	449,369
April	16,111	422,317
May	17,525	461,469
June	17,009	448,790
July	17,422	458,766
August	18,314	482,074
September	17,993	473,176
October	20,430	540,183
November	20,277	538,770
December	19,157	511,133
Total	212,015	5,599,889

The average price on foundry coke for the year was $3.16, and on furnace coke $2.75, this based upon average weekly quotations for spot deliveries.

The following tabulated statement shows the total number of ovens in the Connellsville and lower regions at the close of each year, the annual output, average price and gross revenue from 1880 to 1906, inclusive:

Year.	Total Ovens.	Tons Shipped.	Av. Price.	Gross Revenue.
1880....	7,211	2,205,946	$1.79	$ 3,948,643
1881....	8,208	2,639,002	1.63	4,301,573
1882....	9,283	3,043,394	1.47	4,473,889
1883....	10,176	3,552,402	1.14	4,049,738
1884....	10,543	3,192,105	1.13	3,607,078
1885....	10,471	3,096,012	1.22	3,777,134
1886....	10,952	4,180,521	1.36	5,701,086
1887....	11,923	4,146,989	1.79	7,437,669
1888....	13,975	4,955,553	1.19	5,884,081
1889....	14,458	5,930,428	1.34	7,974,663
1890....	16,020	6,464,156	1.94	12,537,370
1891....	17,204	4,760,665	1.87	8,903,454
1892....	17,256	6,329,452	1.83	11,598,407
1893....	17,513	4,805,623	1.49	7,141,031
1894....	17,834	5,454,451	1.00	5,454,451
1895....	17,947	8,244,438	1.23	10,140,658
1896....	18,351	5,411,602	1.90	10,282,043
1897....	18,628	6,915,052	1.65	11,409,835
1898....	18,643	8,460,112	1.55	13,113,179
1899....	19,689	10,129,764	2.00	20,259,528
1900....	20,954	10,166,234	2.70	27,448,832
1901....	21,575	12,609,949	1.95	24,589,400
1902....	26,329	14,138,740	2.37	33,508,714
1903....	28,092	13,345,230	3.00	40,035,906
1904....	29,119	12,427,468	1.75	21,748,069
1905....	30,842	17,896,526	2.26	40,446,149
1906....	34,059	19,999,326	2.75	54,998,146

Employers Share Profits.—The Nordberg Mfg. Co., Milwaukee, Wis., has adopted a plan of sharing profits with its employes which will add amounts ranging from $30 to $100 a year to the wages of each of the 600 men employed by the day. Based upon the length of service, the men will receive a percentage over and above their yearly remuneration. Those who have been in the employ of the company seven years or more will receive an additional 8 per cent; those employed more than three years and less than seven years will receive 7 per cent; and those employed one year and not more than three years, will be paid 6 per cent. The plan does not include men employed on regular salaries.

India's Manganese Ore.—Rapid development of the mining of manganese ore in India is reported by Consul E. H. Dennison of Bombay. Nine or ten years ago India was not the least interested in this ore, and it was not known that the country had any deposits that could be profitably worked. About 1896 important discoveries were made in the Vigianagram district of the Madras Presidency and mining operations were promptly started. The year 1906 will show a good record for this industry. The United States took the larger share, the shipments going to the ports of Philadelphia and Baltimore. There were exported during the 11 months ending November 30, 310,446 tons of manganese ore as compared with 185,520 tons for the corresponding period in the preceding year.

PRESIDENT HUTTON ON THE ENGINEERING BUILDING.

The first meeting held in the new engineering building in New York was the January meeting of the American Society of Mechanical Engineers. President Hutton of that society in his introductory address called attention to the importance of the event, speaking in part as follows:

"It is a matter which is singularly noteworthy that in the history of engineering in this country, and in the history of Anglo-Saxon civilization, and, therefore, in the history of the world, that a gathering like this should be held now for the first time, in a building devoted to the interests of engineering in its divers specialization, and under the roof of such a building intended to emphasize at once the diversity of these specialties and yet, withal, their fundamental unity. Nowhere else is there a building like this, in which the different branches of engineering are met together as one, and where their unity is to be emphasized by their meeting for conferences, by the existence of a joint library, by the gathering together of their executive officers under one roof. It is a great thing to be the first to do anything. You can never do anything the first time twice. Therefore, it seems to me that there is an especial significance in our being gathered together tonight for the first time to listen to the first paper to be delivered in the building of the engineering societies. It adds especial interest to me, in introducing the speaker of the evening, that he should, in addressing the Society of Mechanical Engineers on the subject allotted to him, address as an associate member of the Institute of Electrical Engineers, emphasizing in that position of his, and in his relation tonight as our speaker, the fact that we are coming together in one under the roof of the engineering societies."

German Concerns Combine.—Cable messages from Germany state that the directors of the Phoenix Coal & Iron Co. of Luisburg, have absorbed the Nordstern Coal Co., of Essen, and have issued a $6,500,000 capital stock, making a total capitalization of $25,000,000. The Phoenix Co. will also issue $5,000,000 in bonds. The new concern becomes the third largest coal and iron company in Germany, ranking next to the Krupp and Gelsenkichen companies. The Phoenix Co. has the largest allotments in the German steel syndicate, while the Nordstern operates eight shafts and owns coal deposits estimated at a billion dollars.

The annual meeting and dinner of the Cleveland branch of the National Metal Trades Association will be held at the Colonial Hotel, March 14.

Heavy Railroad Loans Depress Speculation.

The reappearance of heavy capital demands by the Pennsylvania and Tidewater railroads when investors had come to believe that the railroad systems had completed their money requirements, coupled with the resumption of the selling movement, tended to revive in speculative circles during the past week the pessimism which had been prominently apparent during January. The past week in stock trading, having been decreased to four days by reason of holidays, it naturally was unsatisfactory from a comparative standpoint, but the price currents were marked enough in this short period to clearly indicate the trend of sentiment. The denunciations of many railroad presidents against the far-reaching hostile legislation affecting railroads, either existing in fact or pending in many legislatures and their declarations that these measures will curtail not only their own activity, but business conditions in general, have adversely affected sentiment in speculative buying. The sale of $60,000,000 five-per cent notes announced by the Pennsylvania railroad during the past week completes the loan requirements of the system for 1907, the management states. None of the stocks or bonds that may be authorized at the annual meeting, March 12, will be issued this year, it is announced. Of the proceeds of the loan $50,000,000 will be used to retire a like amount maturing in November, next. The Tidewater Railroad Co.'s loan was $10,000,000 at 6½ per cent. The downward tendency of the market during the week was shown by the average of 20 active railroad stocks in easing off to exactly the figure of the low point recorded in May, 1906, after the San Francisco earthquake. The bank clearings in New York and middle states show a falling off, but in the south, west and Pacific coast the gain is still marked, and the situation, exclusive of New York, indicates a splendid volume of business. The total sales during the four days of the week on the New York exchange were 2,957,000 shares. United States Steel common was active with sales of 202,950 common and 13,925 preferred. Sales of 7,000 American Locomotive common and 14,100 Colorado Fuel & Iron were shown. The average for call money in New York for the week was 4½ per cent, the same as last week, and the corresponding week of last year. Sixty day loans were 5½ per cent this week against 5¼ per cent last week and 5¼ per cent last year.

The American Axe & Tool Co., a Pennsylvania corporation, in its statement of condition, Feb. 6, 1907, reports assets of $3,310,121 in 1907, as compared with $3,195,408 in 1906. Substantial gain is shown in real estate, machinery and buildings.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Feb. 22	Changes In Week	Date 1907 Ann. Meet.	Stock Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Pay.
Allis-Chalmers	14⅛	− ⅛	Sept.	19,820,000			
Allis-Chalmers pr	36¾	−1¼		16,150,000	7 cum		Feb., 1904
American Can	6¾	+ ⅜	Feb.	41,233,300			
Am. Can pr	55	+ ¼		41,233,300	7 cum	5 Q.	Jan., 1907
Am. Car and Fdy	43¾	− ¾	June 27	30,000,000		¾ Q.	Jan., 1907
Am. Car and Fdy pr	102¼	+ ¾		30,000,000	7 n. c.	7 Q.	Jan., 1907
American Loc.	73½	−1⅝	Oct. 5	25,000,000		1¾	Feb., 1907
American Loc. pr	110½	.....		24,100,000	7 cum	7 Q.	Jan., 1907
American Ship.	76¾	− ⅛	Oct. 2	7,000,000	6	1 Q.	Dec. 1906
American Ship. pr	108⅜	+ ⅜		7,900,000	7 n. c.	1¾ Q.	Jan. 1907
Am. Steel Foundries	9¼	− ⅜	Oct. 1	15,810,000			
Am. Steel Foundries pr.	44	+ ¾		17,240,000	6 cum		Aug., 1904
Barney & Smith	71	. ...	June 4	2,000,000	4	4	Ma . ,1907
Barney & Smith pr	138	.....		2,500,000	8 cum	8 Q.	Mar., 1907
Bethlehem Steel	18⅛	.....	April 2	14 862,000			
Bethlehem Steel pr	50	−6		14,908,000	7 n. c.	5 Q.	Feb., 1907
Cambria Steel	45¾	.....	Mar. 19	45,000,000*	6	3 Q.	Feb., 1907
Cambria Iron	48	.....		8,468,000*	4	4 S. A.	Oct., 1906
Chicago Pneumatic Tool	47	.....	Feb. 18	6,145,800	4	4 Q.	Jan., 1907
Colorado Fuel	47⅞	−2	Oct. 21	30,132,000		.....	Apr., 1902
Crucible Steel	10⅝	− ⅛	Oct. 16	24,578,400			
Crucible Steel pr	78	−1		24,436,500	7 cum	6	Dec., 1906
Empire Steel	7	.....	Feb. 27	2,281,400			
Empire Steel pr	47	.....		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	.....	Feb. 19	1,000,000	6	7 Q.	eb., 1907
Fay & Egan pr	128½	.....		1,000,000	7 cum	7 Q.	Feb., 1907
General Electric	158½	−1⅛	May 14	63,643,600	8	8 Q.	Jan., 1907
Harbison-Walker	12¾	.....	Jan. 21	18,000,000	6	.....	
Harbi on-Walker pr	74	.....		9,600,000	6 cum	6 Q.	Jan., 1907
International Pump	34	−1¾	June 4	17,762,500		2	Apr., 1905
International Pump pr	80	.....		11,350,000	6 cum	6 Q.	Feb., 1907
Lackawanna Steel	60	.....	Mar. 13	34,971,400		.....	
Lake Sup. Corp	14⅛	.....	Oct. 2	40,000,000		.....	
New York Air Brake	138	.....	June 18	10,000,000	8	8 Q.	Jan., 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	6	6 Q.	Mar., 1907
Niles-Bement-Pond pr	105	.....		2,000,000	6 cum	6 Q.	Feb., 1907
Otis Elevator Co.	50	+2	March 18	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. pr	94	.....		6,308,500	6 n. c.	6 Q.	Jan., 1907
Penn. Steel	62	.....	May 13	10,750,000			
Penn Steel pr	104	.....		16,500,000	7 n. c.	7 S. A.	Apr., 1906
Pittsburg Coal Co	16	.....	Feb. 11	32,000,000		.....	Nov.
Pittsburg Coal pr	58⅛	.....		32,000,000	7	.....	Apr., 1905
Pressed Stl Car	51¼	−1	Feb. 20	12,500,000		3	Aug., 1904
Pressed Stl. Car pr	98½	+1½		12,500,000	7 n. c.	7 Q.	Feb., 1907
Pullman	170	−1½	Oct. 17	100,000,000	8	8 Q.	Feb., 1907
Railway Stl. Spring	52⅛	− ⅝	Mar 7	13,500,000		4 S. A.	Oct., 1906
Railway Stl Spring pr	99½	+ ⅝		13,500,000	7 cum	7 Q.	Dec. 1906
Rep Iron & Steel	34⅞	−1⅜	Oct. 9	27,191,000		.....	
Rep Iron & Steel pr	98⅜	− ⅝		20,416,900	7 cum	7 Q.	Apr., 1907
Sloss-Sheffield	69	−3¼	Mar. 5	10,000,000	5	5 Q	Oct., 1906
Sloss-Sheffield pr	72¾	.....		6,700,000	7 n. c.	7 Q.	Jan , 1907
Tenn. Coal & Iron	150	.....	May 7	22,553,000	4	4 Q.	Feb., 1907
U. S. Pipe & Fdy	45½	−1⅜	June 26	12,500,000	4	4 Q.	Dec., 1906
U. S. Pipe & Fdy. pr	86⅜	.....		12,500,000	7 n. c.	7 Q.	Dec., 1906
U. S. Steel	45	−1⅝	April 15	508,302,500	2 n. c.	½ Q.	Mar., 1907
U. S. Steel pr	104⅛	− ⅜		360,281,100	7 cum	7 Q.	Feb , 1907
U. S. Steel 5's	98⅞	− ⅛		463,798,000	5	5 A.	.....
Va. Iron, Coal & Coke	57½	....	Sept. 17	8,641,600		.....	
Westinghouse Elec	150	.....	July 24	24,998,700*	10	10 Q.	Jan., 1907
West'ghouse Air Brake	156	.....	Oct. 1	11,000,000*		22½ Q.	Jan., 1907

Par value of shares, $100, except those starred, $50.

In connection with the change in the common dividend from semi-annual to quarterly periods, the Sloss-Sheffield Steel & Iron Co. has issued the statement that common stockholders at the close of business, Feb. 19, 1907, will receive in addition to the quarterly dividend of 1¼ per cent declared, an amount equivalent to the proportion of two months at the same rate, payable March 1.

According to the report of the Montreal Steel Works, Ltd., for the year ended Dec. 31, 1906, the net profits from operations amounted to $196,998. The sum of $36,000 was carried to reserve account; $56,000 was disbursed in seven per cent preferred dividends, and $46,286 on seven per cent common dividends, leaving a surplus for the year of $58,712. The total balance now stands at $127,418, and the reserve account at $100,000, making the total assets over liabilities $227,418.

Recent dividend declarations include the following: American Shipbuilding Co., quarterly dividend of one per cent on common stock, payable March 1; Nova Scotia Steel & Coal Co., Ltd., 1½ per cent on common stock, covering the first three months of 1907, payable April 15. This is the first dividend declared on its common stock since 1904. The regular quarterly dividend of two per cent on preferred stock was declared on Jan. 4 last.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Wat Engine Co., Port Huron, Mich., has increased its capital stock from $12,000 to $15,000.

The General Fireproofing Co., Youngstown, O., has increased its capital stock from $500,000 to $900,000.

The Pioneer Sheet Metal Works Co., Seattle, Wash., has been incorporated and will conduct a plant at 1928 Western avenue.

The Park Implement Co., Iowa Park, Tex., has been formed with a capital of $15,000 by T. C. Thatcher, W. H. Thatcher and C. H. Clark.

The Century Iron Works, St. Louis, Mo., has been incorporated with a capital of $16,000 by Gilbert Anderson, L. D. Goodman and Robert W. Hall.

The Wytheville Iron Works, Wytheville, Va., has been incorporated with a capital of $50,000 by G. S. Bruce, E. Lee Trinkle, R. L. Pierce and E. A. Ewald.

The Panhandle Implement Co., Wichita Falls, Tex., has been chartered with a capital of $20,000. The incorporators are: J. J. Lory, J. P. Jackson, S. C. Smith and J. Lee Jackson.

The Westmoreland Automatic Machine Co., Irwin, Pa., has been incorporated with a capital of $100,000 by J. M. Wolkosky, Frank Magidson, Samuel Printz, Abe Wolkosky and A. C. Snively.

Walter Connally & Co., Tyler, Tex., with a capitalization of $10,000, has been organized by C. W. Boon, C. L. Palmore, Walter Connally, Frank James, Clem H. Roberts and S. A. Fain, to conduct a foundry and machine shop.

The Connellsville Mutual Coke Co., Scottdale, Pa., has been incorporated with a capital of $25,000 by A. P. Byrne, of Scottdale; R. B. Hays, of Masontown, and J. R. and A. L. Byrne, of Everson.

The Willet Engine & Carburetor Co., Buffalo, N. Y., has been incorporated with a capital of $50,000 to manufacture gas engines, etc. The incorporators include E. Michail, I. Michail, C. L. Ingham, E. C. Lufkin and J. G. Willet, all of Buffalo.

S. Cheney & Son, Manlius, N. Y., have incorporated with $100,000 capitalization to conduct a foundry and machine shop. The incorporators are W. W. Cheney, J. H. Tuttle, F. M. Barnum, S. C. Cheney, all of Manlius, and J. Baker, of Syracuse.

The James Radcliff & Sons Co., Paterson, N. J., has been incorporated to do mechanical engineering work, conduct a foundry and machine shop and work in metals. Those interested are J. Radcliff, J. E. Radcliff and A. H. Radcliff, all of Paterson. The capitalization is $25,000.

The Doyle Stove & Furnace Co., Detroit, Mich., with a capitalization of $100,000, will begin the manufacture of heaters and gas burners. John Wirth, Francis J. Doyle and James E. Doyle are interested.

The Genuine Connellsville Coke Co., Uniontown, Pa., has been organized with a capitalization of $10,000 by Evan W. and John E. Hess, of Uniontown; Marvin F. Pickard, of Connellsville; Charles S. Hempstead, of New Salem, and Austin Livingston, of Upper Middletown.

The Mecklenberg Gas & Gasoline Engine Co., South Bend, Ind., has been incorporated to manufacture and sell engines of all kinds. The capital stock of the company is $10,000, and the incorporators are: Alfred C. Mecklenberg, Ralph A. Flink, Henry A. Fink and Hilton Hammond.

The Scioto Tool Co., Chillicothe, O., has filed application for a charter. The capital stock of the company is $10,000, and the incorporators are: David Auch, Dr. W. A. Hall, Quinby Climer, Albert Scholl, G. A. Miller and T. K. Wilson. The new company proposes to manufacture a spike puller and other kindred tools on which it will have patent control.

The Stockport Foundry Co., Stockport, Ia., has been organized with a capitalization of $100,000 and will manufacture ditching machines under the Poulter and Munson patents. Those interested are: Dr. L. Morris, E. T. Harlan, J. H. McCarty, O. A. Collins, R. M. Harlan, A. J. Douglas, M. Munson, M. L. Poulter, S. M. Morris, H. E. Ely, Thompson Clark and S. N. Stonebraker.

The Eureka Machine Co., has been organized by Lansing, Mich., capitalists with a capital stock of $50,000 to manufacture Eureka cement mixers. The company has taken over the property of an unincorporated company at Jackson, Mich., and will carry on the manufacture there. The officers of the company are: President, H. F. Harper; vice president, H. F. Abbott; secretary and manager, Frederick Fisher.

The Cleveland Bell Mfg. & Foundry Co., Cleveland, with a capital of $5,000 has been incorporated by David V. Green of D. V. Green & Co; Siegrid F. Krauss, Ignatz Gabay, Harris Goldstein and David Klein. The company has procured a site on Pittsburg avenue and is now erecting a plant for the manufacture of bells of all kinds.

The Evans Rotary Engine Co., Ltd., has been incorporated with head office at Toronto, and $250,000 capital, the provisional directors being James M. Evans, Kenneth Rose, James H. Chewett, Alice I. Chewett and Frank W. Carey.

The Galt Brass Mfg. Co., Ltd., has been incorporated to manufacture brass goods and plumbers supplies, with $40,000 capital and head office at Galt, Ont. James Scott, B. F. Bennett and Angus Groff are provisional directors.

George Doubleday, Ernest W. Oilman, Sylvester W. Jenkes, Wm. Farwell and Henry D. Lawrence have incorporated the Canadian Rand Co., Ltd., with $500,000 capital and head office at Montreal, to take over the business of the Canadain Rand Drill Co., and manufacture mining machinery.

New Construction:—

The Cincinnati Milling Machine Co., Cincinnati, is preparing to erect several buildings.

Charles R. Evans, 33 Equitable building, Boston, has awarded the contract for a frame foundry addition, one story 40 x 90 feet.

A brick addition 65 x 100 feet, three stories and basement, is to be built to the factory of the J. M. Carpenter Tap & Die Co., Pawtucket, R. I.

The Midvale Steel Co., Philadelphia, has taken out a municipal permit for the erection of a large iron wheel house, 164 x 256 feet.

The American Steel & Wire Co., Worcester, Mass., has awarded the contract for a brick cable storage building, estimated to cost $20,000.

The Atlantic Insulated Wire & Cable Co., 120 Liberty street, New York City, is erecting a concrete factory, two stories 82 x 350 feet at Stamford, Conn.

The Gies Gear Co., Detroit, Mich., is planning the construction of a foundry 40 x 60 feet with a wing 30 x 80 feet and also the enlargement of its office building.

The Triumph Mfg. Co., Cincinnati, has had plans prepared for a stone, brick and iron machine shop, two stories high, 100 x 265 feet. Bids will be received about March 1.

The Fulton Co., Knoxville, Tenn., manufacturer of steam regulators, is planning extensive additions to its plant for the near future. One of the new additions will be a brass and iron foundry.

The Pontiac Iron Foundry Co., Pontiac, Mich., has been organized and will build a factory for the manufacture of gasoline engines. F. G. Skinner, Grand boulevard and Russel street, Detroit, is interested.

The P. & F. Corbin Co., New Britain, Conn., has awarded to The B. H. Hibbard Co. the contract for brick factory building, four stories, 60 x 211 feet, and

a brick factory building, six stories, 60 x 148 feet.

Architects Bearden & Foreman, Chattanooga, Tenn., are drawing plans for a factory to manufacture wagon skeins and other foundry products, which will be erected by the Southern Skein & Foundry Co., a new corporation of that city.

The Newark, O., board of trade has entered into a contract with L. B. Foster & Co., Pittsburg, to start a rolling mill in an old steel plant in that city. The city has agreed to pay a bonus and the company will rebuild and extend the old plant.

Bids have been opened for the new foundry building which the George H. Smith Steel Casting Co., Milwaukee, Wis., will erect to take the place of the one destroyed by fire several weeks ago. The foundry will be 120 by 160 feet and will cost about $25,000.

The Massillon Iron & Steel Co., Massillon, O., at its annual meeting authorized the increase of capital stock from $500,000 to $2,000,000. Additions to the plant are contemplated. The board of directors, consisting of H. A. Croxton, J. W. McClymond, C. M. Russell, C. O. Heggem, Frank E. Fisher, S. W. Croxton and D. T. Croxton, were re-elected.

The S. Obermayer Co. has let contracts for large improvements for its Cincinnati plant on Evans street. The improvements consist of a two-story brick building 75 x 75 feet for manufacturing purposes; also the installation of a 500 horsepower Greenwald Corliss engine, with new improved rope drives.

Most of the structural iron for the new steel plant to be erected by the Petroleum Iron Co. at the new town of Petroleum, three miles west of Sharon, Pa., has been delivered, and as soon as the weather breaks, the work of erecting will commence. The boiler house is partially completed and the office building is about ready for the roof.

The Ralston Steel Car Co., Columbus, O., has purchased six acres adjoining its plant on which it proposes to build further extensions and a general office building. The six acres make the company's real estate holdings about 30 acres, which it expects to fully utilize within the next few years. A new planing mill is to be erected in the spring and the castings yard and trackage of the plant are to be extended.

The Rock Island Tool Co., Rock Island, Ill., recently organized, has taken over the business of the Jacobson Machine Mfg. Co., Warren, Pa., and will manufacture a full line of vises and other tools. The company states that it expects to build next fall. At present it is occupying temporary foundry and machine shops and is in the market for foundry equipment, machine tools, electric motors and power plant equipment. C. E. Shields, Rock Island, will be active in the management of the business.

The Beck & Corbitt Iron Co., St. Louis, has bought the property and business of the Paddock-Hawley Iron Co., of that city, and as a result the New Paddock-Hawley Iron Co., Omaha, Neb., will abandon St. Louis, and will operate in Omaha as before. The Paddock-Hawley Iron Co. was bought last July by Baum Bros., of Omaha, who reincorporated in Nebraska under the name of the New Paddock-Hawley Iron Co. The absorption of the business by Beck & Corbitt involves more than $1,000,000, though the exact terms of the sale have not been made public. C. T. Brace, who has been in charge of the Paddock-Hawley interests in St. Louis, has been elected vice president of the Beck & Corbitt Co. For the present Beck & Corbitt will continue to use the buildings occupied by the Paddock-Hawley concern, but it is the intention of the company to build an addition to its present building on Main street. The capital stock of the company will also likely be increased. The Beck & Corbitt Iron Co. is one of the oldest heavy hardware houses in the west, having been in St. Louis 45 years.

General Industrial Notes:—

C. W. Franzheim has been elected president, W. A. Isett vice president, and George W. Franzheim secretary of the Wheeling Enamel Iron Co., Wheeling, W. Va.

The Union Steam Pump Co., Battle Creek, Mich., has acquired a large tract of land opposite the site of its present plant in that city. The ground will be held for future extensions.

The new castings plant of Leo and Walter Lindenberg, Columbus, O., has been placed in operation and several heats have been run off. The plant will make light gray iron and malleable castings for pipe fitting and similar work.

The new foundry of the Lattimer-Williams Mfg. Co., Columbus, O., manufacturer of stoves, has been completed and the structure for cleaning rooms, tumblers and wash rooms is almost ready for operation. These extensions will practically double the capacity of the plant.

The Cornwall Iron Co., Lebanon, Pa., has elected the following directors for 1907: R. Percy Alden and C. H. McCulliugh Jr., New York; Edward C. Freeman, Isabel C. Freeman and Henry C. Grittinger. The present officers are: Edward C. Freeman, president and treasurer, and A. M. Keiser, secretary.

The Chicago Pneumatic Tool Co., Chicago, at its annual meeting in Jersey City, re-elected its retiring directors, and the board now stands as follows: J. R. McGinley, W. O. Duntley, A. W. Maconochie, W. A. Mitchell, Julius Keller, J. W. Duntley, C. M. Schwab, J. C. Taite and Oliver Wrenn.

At the annual meeting of the stockholders of the J. A. Fay & Egan Co., Cincinnati, the following officers and directors were elected: Thomas P. Egan, president; D. P. and Fred Egan, vice presidents; A. A. Faber, treasurer; William Green, secretary; Griffith Rawson, John E. Bruce, W. H. Doane, C. P. Egan and Rudolph Kleybolte.

The Brier Hill Iron & Coal Co., Youngstown, O., at its annual meeting, elected the following officers: George Tod, president; J. G. Butler Jr., vice president and general manager; R. C. Steese, secretary, and H. H. Stambaugh, treasurer. George Tod, J. G. Butler Jr., H. H. Stambaugh, John and David Tod constitute the board of directors.

The Reading Iron Co., Reading, Pa., at its annual meeting, elected the following directors: George F. Baer, F. C. Smink, Joseph F. Harris, Samuel R. Seyfert and Frank L. Connard. The board organized by electing the following officers: President, F. C. Smink; chairman of the board, George F. Baer; secretary, George W. Delaney, and treasurer, Frederick Butler.

The American Roll & Foundry Co., Canton, O., has completed its new plant. The company starts out with a large number of orders, and it is expected that the plant will give employment to from 100 to 150 men at the start. Chilled rolls and about everything in the line of rolling mill and tin plate machinery will be manufactured. James B. Baird, formerly president of the Canton Roll & Machine Co., is president.

Because of failure to receive the final payment of $167,500 up to midnight, Feb. 18, when time of such payment expired, Judge Bradford, in U. S. court, Wilmington, Del., issued a rule on John B. Newkirk, of Philadelphia, requiring him to show cause why the $57,500 paid by him on account of the purchase of the plant of the Diamond State Steel Co. should not be forfeited and the resale of the property ordered.

The annual report of the Champion Iron Co., Kenton, O., for the year 1906, was submitted to the stockholders Feb. 13. The year proved to be one of the most profitable in the history of the company. The regular annual dividend was declared. The company reports that it has a larger number of contracts on hand in the structural steel, ornamental iron and jail and prison departments than it ever had before this early in the year.

The stockholders of the Heimann Foundry & Machine Co., Massillon, O., recently incorporated, have elected H. A. Croxton, president; August Heimann, vice president, and F. G. Harrison, secretary and treasurer. The officers with J. C. Corns and F. W. Arnold constitute

the board of directors. The company took action to change its name from the Massillon Foundry & Machine Co. under which the incorporation papers were issued.

The officers and retiring directors of the Pressed Steel Car Co., Pittsburg, were re-elected at the annual meeting as follows: F. N. Hoffstot, New York, president; J. W. Friend, Pittsburg, vice president; O. C. Gayley, New York, second vice president; Adrian H. Larkin, New York, secretary; J. H. Regan, New York, assistant secretary; P. G. Jenks, Pittsburg, treasurer, and S. E. Moore, Pittsburg, auditor. The directors are: James A. Blair, James H. Reed, F. N. Hoffstot, A. S. Matheson, T. H. Given, J. W. Friend, James N. Wallace, F. G. Ely and Adrian H. Larkin.

The business of John A. Caldwell, 45 Broadway, New York, dealer in fuel-saving devices, has been merged into the Sarco Fuel Saving & Engineering Co. The company has just been incorporated with a capital of $100,000 to take over the American interests of Sanders, Rehders & Co., Ltd., fuel-economy specialists of London and Manchester, and to manufacture on this side their various apparatus. Offices have been engaged in the New West street building, New York, and work shops established at 81-85 Washington street, in that city. Mr. Sanders is president and Mr. Caldwell general manager of the new corporation.

Announcement is made that the partnership which has existed for many years under the name of Wm. Brummeler & Sons, Grand Rapids, Mich., manufacturers and jobbers of sheet metal goods and tinners' supplies, and also as proprietors of the Grand Rapids Rag & Metal Co., has been discontinued on account of the death of William Brummeler, senior member of the firm. The surviving partners, Alfred J. Brummeler, William G. Brummeler and Richard J. Brummeler, have incorporated the sheet metal and tinners' supplies business under the name of Wm. Brummeler's Sons Co., which will be conducted at 249-251 South Ionia street, with the following officers: Alfred J. Brummeler, president and manager; William G. Brummeler, vice president, and Richard J. Brummeler, secretary and treasurer. The rag and metal business has also been incorporated under the name of the Grand Rapids Rag & Metal Co., which will be conducted at 253-263 South Ionia street, with the following officers: William G. Brummeler, president and manager; Richard J. Brummeler, vice president and secretary, and Alfred J. Brummeler, treasurer.

Trade Notes:—

The Aluminum Co. of America has placed an order with the Dayton Globe Iron Works Co., Dayton, O., for 24 60-inch turbines with a total capacity of 24,000 horsepower, to be installed in its plant at Massena, N. Y.

The Wilbraham-Green Blower Co., Philadelphia, has just received from a Japanese Shipbuilding Co. an order for 16 large Green blowers, each driven by a vertical engine on the same bedplate, for burning fuel oil under the boilers of two 16,000-ton steamers. These vessels have about 13,000 horsepower each and are driven by turbine engines. The same company has also furnished a number of blowers for burning fuel oil on steamers of the American-Hawaiian Steamship Co., the Standard Oil Co. and other lines operating on the Atlantic and Pacific coasts.

John F. Allen, 370-372 Gerard avenue, New York City, maker of the Allen portable pneumatic riveters, reports a good demand for machines and states that two riveters have just been shipped to the American Car & Foundry Co., at Huntington, W. Va. This makes six Allen riveters sold this concern during this month, two of the others going to Jeffersonville, Ind., plant of the American Car & Foundry Co., and two to the St. Charles, Mo., plant. The firm has also shipped two riveters to the Atchison, Topeka & Sant Fe Railroad Co., Topeka, Kas.

Fires:—

Newell, Booth & Co.'s brass foundry, Philadelphia, was damaged by fire recently, causing a loss of $1,000.

The machine shop of the Andrews Heating Co., Minneapolis, Minn., was damaged to the extent of $5,000 by fire Feb. 10.

Fire in the roll turning shop of the Illinois Steel Co., Joliet, Ill., Feb. 16, caused damage of about $7,000.

The Pullman Car Co., Chicago, suffered a loss of $150,000 by fire recently in its lumber yard.

The rolling mill of the Rockaway Iron & Steel Co., Rockaway, N. J., was destroyed by fire Feb. 21, causing a loss of $100,000.

The employes' club house of the Illinois Steel Co., Joliet, Ill., was damaged by fire Feb. 21. The building represents an outlay of $75,000.

About $10,000 damage was done to the plant of the Benjamin Opdyke Corrugated Iron Works, Philadelphia, by fire Feb. 20.

The foundry of the Thomas-Allbright Co., Goshen, Ind., was partially destroyed by fire Feb. 8. The loss is covered by insurance.

The plant of the Parker-Hensell Engineering Co., Brunswick, Ga., suffered a fire loss of $75,000 Feb. 21. Among the buildings damaged were the machine shops and foundry.

The chemical plant of the Ashland Iron & Steel Co., Ashland, Wis., was damaged to the extent of $6,500 by fire on the night of Feb. 18. Insurance is adequate.

The round house and machine shops of the Missouri & Louisiana railroad, Bevier, Mo., were destroyed by fire Feb. 7, causing a loss estimated at $40,000.

The brass and lead works of the James Robertson Co., Montreal, Can., was damaged to the extent of $20,000 by fire Feb. 15. The loss is covered by insurance.

The machine shops, round house, blacksmith shop and outbuildings of the Montpelier & Wells River Railroad Co., Montpelier, Vt., were badly damaged by fire Feb. 7, causing a loss of $30,000.

The plant of the Fort Worth Iron & Steel Co., Fort Worth, Tex., was damaed to the extent of $100,000 as a result of a fire which followed an explosion in a furnace at the mill, Feb. 13.

The plant of the Peru Plow & Wheel Co., Peru, Ill., suffered from a fire Feb. 14, which badly damaged the fitting room, machine shop, pattern room, superintendent's office and a small warehouse.

The blacksmith shop of the South Baltimore Steel Car & Foundry Co., South Baltimore, Md., was partially destroyed by fire Feb. 17, the loss being in the neighborhood of $30,000. The burned building was in the center of the extensive plant, which was saved from destruction only by heroic efforts of the firemen. The shop will be rebuilt at once.

Michigan's Fence Output.—The manufacture of wire fence in Michigan during 1906 amounted to 4,581,200 tons, according to figures compiled by Labor Commissioner McLeod. The aggregate of raw material used in the wire factories of the state cost $2,685,000, and the annual pay roll of the companies aggregated $635,272. The wire fence industry, which is a comparatively new one in Michigan, has nearly doubled its output during the past two years.

Freighter Makes Record. — The steamer W. E. Corey, of the Pittsburg Steamship Co., made a wonderful record as an ore freighter on the great lakes last season, and carried more cargo than was ever moved by one vessel in the same time in the world. The boat was in commission 240 days, covered 44,529 miles and carried 302,547 tons of iron ore. She delivered 30 cargoes, averaging a little more than 10,000 tons to the trip. Most of the Corey's trips were from the head of Lake Superior to Lake Erie ports.

ROSEATE VIEW

Of the Year's Prosperity—Production of the Ohio Farmer Prophet for Coming Year.

"The manufacturing business of this country will be exceeded and expanded to its full capacity, and all industries will be active and prosperous. The price of pig iron will be higher in 1907 than in 1906. This year will be the third prosperous one since 1904 for a rising iron market, for commercial prosperity and for general inflation of values."

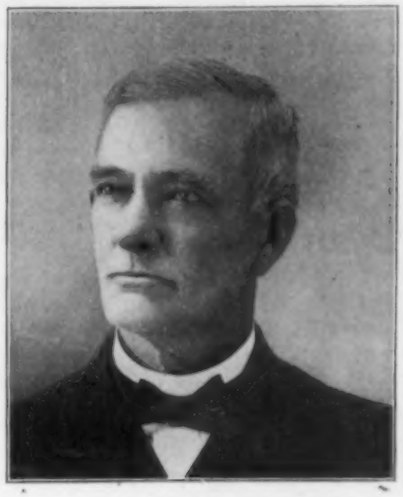
The above is a part of the forecast for 1907 issued by Samuel Benner, in a new edition of his little volume entitled "Benner's Prophecies."

Mr. Benner is the well-known Ohio farmer who has attracted attention for many years by his prophecies in regard to the ups and downs in prices. In November, 1903, Mr. Benner predicted that prices for pig iron, railroad stocks and many commodities would be lower in 1904 than they were in 1903, and this prediction was fulfilled. He also predicted that after the year 1904 there would be a revival in trade and better times, and that higher prices would prevail until the year 1911. In his forecast for 1905, he predicted that prices for pig iron would advance and be higher in 1905 than in 1904; that the volume of trade in 1905 would exceed that of 1904 many millions of dollars, and that there would be good times for four years following. "Who," said Mr. Benner in February, 1905, "can hesitate to buy pig iron, railroad stocks and industrial securities now to make money?"

The new edition is like the edition of 1905 excepting that the forecast for 1907 is added. The theory of cycles is fully explained.

Samuel Benner was born at Bloom furnace, Lawrence county, O., Aug. 17, 1832. During his early days his father was interested in some furnaces in the Hanging Rock Iron region, and also owned a forge on Paint creek near Bainbridge, Ross county, O. When the youth's school days were over, he was taught book-keeping by his father and placed in the forge office, where he kept account of the pig iron bought and the hammered iron sold, and carried on considerable correspondence about charcoal, which was used in the fires of the forge. In 1852, Mr. Benner went to Gallia furnace, Gallia county, O., to keep store and clerk; a few years later he went to Keystone furnace, Jackson county, O., to take charge of the books, and later went to Eagle furnace, Vinton county, to act in the capacity of book-keeper and manager. By reason of the severe depression in the iron trade in 1861, Mr. Benner began to look backward over his experience at iron plants. Then the question arose in his mind, "Why should there be a period of good times and high prices followed by a period of hard times and low prices?" He remembered that in the year 1850 the price of pig iron had been down to $7.00 per ton, and in 1854 the price had advanced to $50.00; that in 1861 the price was down below $20.00 a ton, just where it had been in the year 1850.

"I wondered," says Mr. Benner in a recent letter to the editor of THE IRON TRADE REVIEW, "why this was so; that the price of pig iron should rise $30.00 a ton and then fall $30.00 a ton in a few years. In trying to solve this problem, which probably is a result of tariffs and currencies, I was led to discover by the examination of prices in the past that the ups and downs in the iron trade occurred in accordance with certain rules and well defined cycles. These cycles are explained and verified in my book of prophecies. This book was first published in the year 1875, with predictions for the future as to the ups and downs in the prices of pig iron, hogs, corn and provisions, and the trend of general business, as governed by the cycles in iron. The iron cycle has always been my guide in the many successful predictions which I have made from year to year, as to the future direction of iron and general business, and the changes from good to poor trade, and from poor trade to good times and prosperity."



SAMUEL BENNER.

Will Build Plant.—The Standard Welding Co., Cleveland, has purchased a tract of land containing five acres on the west side of the city, and in the spring, will erect a new plant to accommodate its extended business. An architect is now at work upon the plans. A main building, 125 by 450 feet, 50 feet of which will be three stories and 75 feet one story, in addition to other structures, will be erected.

SOCIAL SETTLEMENT

Will Be Feature of the New Plant of the Washburn Steel Castings & Coupler Co.

A social settlement for all those who are connected with the business is to be a principal feature of the extensive new plant which the Washburn Steel Castings & Coupler Co. is preparing to erect at Minneapolis. Thirty-seven acres of land on the outskirts of the city have been acquired, and this expanse of ground will be used in working out the ideas of the company.

Plans Club Houses.

Club houses for the employes with tennis courts and other facilities for their amusement, and, if the situation warrants, a number of small dwelling houses for the workmen are among the investments contemplated. "It is our idea to make our whole plant in the nature of a social organization," says Stanley Washburn, sales manager of the company. "We are firmly of the opinion that it is the duty of all employers of labor to consider not only the mere profit of their investment, but at the same time to take such steps as may elevate in the highest degree the happiness and social well being of all the men employed. It is our intention, as far as possible, to make this plant a model one, not only as far as manufacturing with profit is concerned, but also in our relations with the workmen. We believe strongly in the co-operative idea. We are considering a proposition of allowing our employes a participation in the stock of the company so that every man may feel that he is not only an employe in the concern, but a co-worker with us."

To Erect Extensive Plant.

The beginning of operations along this line, which, it is expected will take several years to conclude, will be in March or April. The first building to be erected will be a steel foundry with a capacity of 12,000 tons a year. The main building will be from 400 to 500 feet long and from 100 to 150 feet in width. This will be followed by an administration building 60 x 100 feet, two stories in height, and in this connection store houses, small chemical laboratories, power plant and such other auxiliary buildings will be put up. The next step contemplated is the building of car shops in which all types of freight and tank cars are to be constructed from steel made in the company's own foundry. A gray iron foundry, machine shops and perhaps a boiler shop are other proposed investments of the future.

TARIFF REVISIONS

Announced by Canadian Minister of Finance.—Industrial News of Dominion.

Toronto, Can., Feb. 26.—Hon. W. S. Fielding, Canadian finance minister, announced a large number of changes in the tariff now before Parliament, most of them of a minor or technical character.

The following iron and steel articles are added to the free list; rotary kilns, revolving roasters and furnaces of metals, of a kind not made in Canada; parts of machinery for twine manufacturers; well drilling machinery and apparatus of a kind not made in Canada; boiler plate not more than 30 inches wide; wrought seamless tubes for boilers; wire rigging; steel wire to be used in the manufacture of ropes; and locomotives and passenger cars, etc., under the control of railway companies in the United States crossing the frontier.

A new item is introduced comprising flat-eye bar blanks, not punched, drilled or rolled, and edge plates of steel over 12 inches wide for use in steel structural work or car construction, on which the general tariff rate is fixed at $3 per ton and the preferential rate at $2. On scrap iron and steel the British preferential rate has been reduced from 70c to 50c per ton.

The clause respecting the duty on rolled iron or steel beams which provided for an ad valorem duty of 10 per cent general and 5 per cent preferential has been altered to read as follows: "Rolled iron or steel beams, channels, angles, and other rolled shapes of iron or steel not punched, drilled or further manufactured than rolled, weighing not less than 35 pounds per lineal yard, not being square, flat, oval or round shapes and not being railway bars or rails, per ton, preferential $2, general $3." An increase in the drawbacks from 95 to 99 per cent on duties on articles imported for manufacturing includes the following: Iron and steel used in manufacture of mowing machines, reapers, harvesters, etc.; steel used in the manufacture of springs and axles for vehicles other than railway cars; spiral spring steel used in the manufacture of railway spiral springs; and steel used in the manufacture of cutlery and a variety of tools.

Additions to the drawback list fixed at 99 per cent are: Rolled angles of iron or steel, nine and ten gage, not over one and one-half inches wide for bedstead manufacture; lap-welded tubing of iron or steel not less than two and one half inches diameter, testing 1,000 pounds pressure to the square inch, when used in oil or natural gas wells and for transmission of natural gas; machinery and other articles imported prior to July 1, 1908, when entering into the cost of tin plate manufactured in Canada; and bituminous coal imported by proprietors of smelting works and converted into coke for the smelting of metals from ores.

Large Canadian Orders:—The Temiskaming & Northern Ontario railway commission has awarded to the Algoma Steel Co. of Sault Ste. Marie, Ont., the contract for 65,000 tons of steel rails necessary to complete the section of the road from Englehart, the present temporary terminus, northward to a junction with the Grand Trunk Pacific, a distance of 45 miles. The commission has also given orders for 200 more freight cars to cost about $175,000. Of these, 100 will be of steel, to be built by the Montreal Car Construction Co. The remaining 100 will be wooden cars, to be built by the Rathbun Co., Deseronti, Ont.

A NOTABLE CONCRETE BUILDING.

The warehouse of Montgomery Ward & Co., Chicago, which is now under construction, promises to be one of the most notable concrete structures ever erected. The building will cover 140,000 square feet, or approximately 3¼ acres, and will have a height of eight stories. The foundations are piles, with reinforced concrete caps. All columns, exterior walls, and several of the interior walls, girders, floors, stairs and roof will also be of reinforced concrete and the dock will be made of the same material. The first floor will contain four tracks with spacing for 40 freight cars. The various floors will be divided into seven sections, with about equal areas, separated by fireproof walls and fire doors. The stairs and elevators will be enclosed in concrete shafts. Approximately 6,000 tons of twisted steel bars, spiral hoops and rods will be used for reinforcing the columns, the square, twisted, and round rods being used in the girders and floors. Approximately 80,000 barrels of cement will be required. The contract for its erection has been awarded to Geo. A. Fuller Co.

PENNSYLVANIA INDUSTRIES.

Harrisburg, Pa., Feb. 26.—Potts Bros., Iron Co., has awarded the contract for the rebuilding of the burned mill, Pottstown, to Fred Keiser. The puddle mill 42 x 160 feet, will be rebuilt. The plate mill will also be improved and the machinery overhauled.

The entire plant of the Chester Tube Co., Chester, is to be put into operation again.

The Lebanon Valley Iron Co. has re-elected these officers: President, H. H. Light; treasurer, S. P. Light; secretary, W. S. Davis. The officers and S. L. Light, J. Warren Light, Eli Attwood, Lebanon, W. W. Light and E. D. Horst, Reading, form the board of directors.

The Danville Stone & Mfg. Co., Danville, elected W. B. Chamberlain, president; Alexander Foster, secretary, and W. F. McClure, treasurer at the annual meeting.

SCARCITY OF LABOR

Diminishes Coke Output of Alabama Consolidated Coal & Iron Co.

The annual report of the Alabama Consolidated Coal & Iron Co., in pamphlet form is being distributed to stockholders. The financial statement, covering operations in the year ending Oct. 31, 1906, was made public several weeks ago. In discussing the affairs of the company President Bush says:

"The coke ovens at the different plants were operated continuously during the year excepting short periods for holidays, etc. The same scarcity of coke oven labor as prevailed last year continued through the fiscal year, except that the scarcity was accentuated on account of increased demand for labor of all kinds. During the year the production of coke was 262,119 tons, as against 268,383 tons the year previous—which was a slight falling off—due entirely to inability to secure sufficient coke oven labor.

"The improvements at the coal mines during the year were chiefly the completion of construction of 150 new coke ovens at two of the plants, improvement of the haulage system, enlargement of water works, construction of additonal houses for miners and coke oven labor—thus bringing the capacity of one of the mines up to 1,400 tons per day and the other 1,000 tons per day. Work on the new furnace at Gadsden has been continued during the year, and pushed as vigorously as labor conditions and delays of machinery and material would admit."

Will Remove Dust.—The Carnegie Steel Co. has awarded contracts to the Buffalo Forge Co. for gas scrubbing fans to be installed at the Edgar Thomson furnaces, the Carrie furnaces and the Youngstown plant. These are especially designed for removing the ore dust from blast furnace gases, preparatory to their use in gas engines. The first gas engine at the Edgar Thomson works has been in successful operation for about six weeks, and the same system will be installed at the other points mentioned. All of the scrubbing fans are being built by the Buffalo Forge Co., which has installed similar outfits at the Lackawanna Steel Co.'s plant and elsewhere.

The Marion Steam Shovel Co., Marion, O., will distribute $50,000 among its employes, according to the wages and the amount of time worked.